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President's report

Proposed financing

Republic of India

Scaling Up Agricultural Technologies for Smallholder Farmers Project

Project ID: 2000001941

Note to Executive Board representatives

Focal points:

Technical questions:

Nigel Brett
Regional Director
Asia and the Pacific Division
Tel.: +39 06 5459 2516
e-mail: n.brett@ifad.org

Rasha Omar
Country Director
Tel.: +91 9811990167
e-mail: r.omar@ifad.org

Dispatch of documentation:

Deirdre Mc Grenra
Chief
Institutional Governance and Member
Relations
Tel.: +39 06 5459 2374
e-mail: gb@ifad.org

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For: Approval

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- I. Negotiated financing agreement [to be tabled at the session]
- II. Logical framework

Project delivery team

Regional Director:	Nigel Brett
Country Director:	Rasha Omar
Project Technical Lead:	Harold Liversage
Financial Management Officer:	Robert Creswell
Climate and Environment Specialist:	Vidhisha Samarasekara
Legal Officer:	Itziar Garcia Villanueva

Abbreviations and acronyms

AE	agricultural engineering
AED	Agriculture Engineering Division
ATB	agricultural tool bank
CHC	custom hiring centre
CFC	common facility centre
CI	community institution
COSOP	country strategic opportunities programme
FMUs	farm mechanization units
ICAR	Indian Council of Agricultural Research
KVKs	Krishi Vigyan Kendras
KW/ha	kilowatt per hectare
MoA&FW	Ministry of Agriculture and Farmers' Welfare
PIU	project implementation unit
SCATE	Scaling up Agricultural Technologies for Smallholder Farmers
SDA	state department of agriculture
SDGs	Sustainable Development Goals
SMAM	Sub-Mission on Agricultural Mechanization
SPMU	State project management unit
SRLM	state rural livelihood mission

Map of the project area

India

Design report



The designations employed and the presentation of the material in this map do not imply the expression of any opinion whatsoever on the part of IFAD concerning the delimitation of the frontiers or boundaries, or the authorities thereof.

Map compiled by IFAD | 05-02-2019

Financing summary

Initiating institution:	IFAD
Borrower:	Republic of India
Grant recipient:	Republic of India
Executing agency:	Indian Council of Agricultural Research
Total project cost:	US\$124.27 million
Amount of IFAD loan:	US\$66.1 million
Amount of IFAD grant:	US\$1.0 million
Amount of IFAD climate finance:*	US\$64.1 million
Terms of IFAD loan:	Ordinary terms
Cofinancier[s]:	Domestic cofinancing
Amount of cofinancing:	Bank financing: US\$5.73 million
Terms of cofinancing:	None
Contribution of borrower/recipient:	US\$41.55 million
Contribution of beneficiaries:	US\$9.9 million
Financing gap:	None
Appraising institution:	IFAD
Cooperating institution:	IFAD

* As per the MDB Methodologies for Tracking Climate Adaptation and Mitigation Finance.

Recommendation for approval

The Executive Board is invited to approve the recommendation contained in paragraph 45.

I. Context

A. National context and rationale for IFAD involvement

National context

1. The Republic of India is the third largest economy in terms of purchasing power parity and yet remains dependent on agriculture. The Government of India's current focus is to double farmers' income by 2022, which can be accomplished by promoting agricultural mechanization. The Sub-Mission on Agricultural Mechanization (SMAM) is expanding agricultural mechanization with a major focus on prime movers (tractors, power tillers, combine harvesters). Given that 85 per cent of farmers are small and marginal, with landholdings of less than 2 ha; that 75 per cent of the agricultural work is performed by women; and that labour accounts for 60 per cent of production costs, there is a need to refocus agricultural engineering (AE) technology beyond tractorization on the needs of small and marginal farmers. To do so, AE technology must be (i) more location-specific; (ii) geared more to building farmers' capacity to adapt to climate change (climate resilience); (iii) more responsive to women's needs and energy efficiency concerns; and (iv) must create business opportunities for youth. In order to achieve this, the Scaling up Agricultural Technologies for Smallholder Farmers (SCATE) project promotes the participatory development of AE technology, in-field demonstrations and the scaling up of affordable customized technologies.
2. The key actors in the agricultural mechanization process are: (i) SMAM; (ii) the Agricultural Engineering Division (AED) of the Indian Council of Agricultural Research (ICAR), with its network of AE technology institutes, farm machinery testing and training institutes and the All India Coordinated Research Project on agricultural machinery technologies; (iii) state agricultural universities and central agricultural universities; (iv) Krishi Vigyan Kendras (KVKs), district agricultural extension centres that link the ICAR and farmers, seek to apply research to localized settings and train farmers in new practices; (v) the Agricultural Machinery Manufacturers Association; (vi) the state departments of agriculture (SDAs); and (vii) farmers and their organizations.

Special aspects relating to IFAD's corporate mainstreaming priorities

3. This project will address issues related to the feminization of agriculture and youth disinterest in farming, as well as the growing impact of climate change on agriculture. Accordingly, it will leverage the existing women-led community institutions, largely comprised of households below the poverty line, to increase their access to AE technologies, in keeping with the strategic objectives of the IFAD Policy on Gender Equality and Women's Empowerment. Mechanization and the employment options it brings will also address the issue of youth disinterest in farming. The project has designed youth-specific interventions such as research fellowships, mechanics training and support for the creation of agriservice centres. This project is not classified as nutrition-sensitive; however, the nutrition states of the target beneficiaries are expected to improve through higher productivity and income levels.

Rationale for IFAD engagement

4. The rationale for IFAD engagement is the following: (i) the poverty, women and youth focus and climate resilience specificity of this project are in sync with IFAD's main corporate mainstreaming priorities; (ii) ICAR's orientation toward pro-poor

technology and maximizing rural outreach in this project coincides with IFAD's mandate of contributing to rural poverty reduction; (iii) the focus of IFAD's India portfolio on higher agricultural productivity and income in economically weaker areas is in synergy with the objectives of this project; and (iv) the project is aligned with IFAD's country strategic opportunities programme (COSOP) 2018-2024, which highlights IFAD's commitment to working toward making smallholder food and agricultural production systems remunerative, sustainable and resilient.

B. Lessons learned

5. This project design draws on lessons from the evaluation of the Government's mechanization scheme, the Cereal Systems Initiative for South Asia, the promotion of community institutions by state rural livelihood missions (SRLMs), and IFAD-cofinanced projects in India.
6. Technology adoption is enabled by the availability of relevant technology, quality demonstration and incentives for adoption. Women were found to prioritize the following features in new technologies: time and cost savings, reduced drudgery and improved crop establishment and yields. Subsidies for machinery acquisition should be combined with an incentive for user expansion to drive the adoption of new machinery and ensure that the farm machinery is fully utilized.
7. Free demonstrations do not lead to significant uptake. Alternative measures for successful demonstration include: (i) adequate facilitation with local communities (introduction of technologies and information about their usefulness) prior to demonstration; (ii) attention to field-level demonstration and farmers' training; (iii) emphasis on the beneficiary contribution to the financing of technology acquisition.
8. Community institutions (CIs) are effective platforms for reaching the rural poor. CIs include self-help groups, village organizations, etc. CI capacity can be harnessed to increase smallholder access to AE technologies, and the project will be working mainly with self-help groups and village organizations that have all-women members.
9. Community-owned and managed custom hiring centres (CHCs) and common facility centres (CFCs) have high social returns but require government subsidies. The experience from community-managed CHCs and CFCs indicates higher capacity utilization, no surge pricing during the peak season and improved smallholder access. Five features of effective community-managed CHCs and CFCs are: (i) preference being given to implements that are power-operated and required year round; (ii) equipment that women find easy to use; (iii) training and mentorship to manage CHCs and CFCs as businesses; (iv) skills training for local youth to operate and repair machinery; and (v) a higher level of subsidies than those provided to individually owned CHCs to enable CIs to acquire and operate AE technologies.
10. Leveraging government field capacity is key to promoting mechanization. The project will collaborate with SMAM in the demonstration of new farm machinery and in the inclusion of successfully demonstrated and certified AE technologies in the list of machinery subsidized by SMAM.

II. Project description

A. Project objectives, geographic area of intervention and target groups

11. **Project goal and objectives.** The goal of the project is to enable poor rural households to increase farm income through use of affordable and efficient AE

technologies.¹ The goal will be achieved through the development objective of increased labour and farm productivity through adoption of AE technologies.

12. **Geographic areas of intervention.** The project will be implemented in two states in the north-eastern region (Assam and Nagaland) and three eastern states (Chhattisgarh, Jharkhand and Odisha) with high poverty levels, rainfed agriculture systems and low levels of available farm power. The project will be implemented in 31 selected districts in these five states, covering aspirational districts and districts with well-performing KVKs and where there is a higher incidence of CIs that are owned and managed by women.
13. **Targeting and target groups:** The project will adopt: (i) geographic targeting for the selection of states and districts based on high levels of poverty, low availability of farm power and low levels of AE technology dissemination and adoption; (ii) direct targeting to address the needs of both women in small and marginal farm households and hill farmers, especially the tribal households among them; and (iii) self-targeting for the demonstration and promotion of technology. The project will also target youth through three main activities: research fellowships (50 youths), the selection of lead farmers (2,000 youths) and the training of youth to service and repair AE technologies (170 youth). In total, 400,000 persons will receive project services, with women representing 75 per cent.
14. The project area has 40 per cent of households below the poverty line (twice the national average) and a 50 per cent presence of scheduled tribes, with more than 75 per cent of farmers constituting small and marginal landholders and cultivating 32 per cent of the landholding area. Technology promotion and adoption will be undertaken through existing CIs consisting of socio-economically disadvantaged households largely below the poverty line. This targeting approach has a dual benefit: (i) poor households are the primary beneficiaries of the development and dissemination of AE technologies; and (ii) women become the agents of change for improved labour and farm productivity and climate resilience in their household.

B. Components/outcomes and activities

15. The project will have the following two components: (i) Participatory technology development; and (ii) Business models for scaling up appropriate AE technologies.
16. Under the first component, the project will develop an inventory of location-specific AE technologies, build ICAR capacity to develop AE research interest among youth through awards and fellowships, develop national technology forums, protocols and training manuals, and train scientists/engineers/economists to conduct techno-economic assessments of technologies and demonstrations. The project will create an innovation platform to promote: (i) new technology development, from concept to prototype; (ii) the adaptation/customization of existing technologies; and (iii) the movement of existing prototypes into commercial production. Access to the innovation platform will be open to public and private research institutions. Proposals received from the innovation platform will be evaluated from a smallholder, women's drudgery and climate resilience perspective, and selected proposals will be funded. These activities will help reduce the mismatch between needs and the availability of smallholder-centric AE technology.
17. Under the second component, the project will support the training of lead farmers and the organization of lead farmer-led field days. The training will be organized by KVKs. The project will support service and after-sales centres through state agrocorporations, existing private agriculture machinery centres and agriculture input centres. In addition, local youth will be selected, trained and supported to establish after-sales service centres. The project will develop partnerships with SRLMs, SDAs and other agencies to help existing CIs establish farm mechanization units (FMUs), CFCs for processing and agricultural tool banks (ATBs). The project

¹ Which will include capitalizing on climate adaptation and mitigation practices and synergies.

will also support individual ownership of AE machinery (other than prime movers) by smallholders. The project will seek to develop partnerships for scaling up with agribusinesses involved in machinery hire services along the Uber model. The project will provide CIs with technology incentives for AE machinery acquisition and will pilot an innovative user expansion support initiative.

18. Expected outcomes from the project include increased farm power, lower labour costs, higher farm productivity, less drudgery, increased climate resilience, and greater access by smallholders to mechanized solutions. The outcomes will contribute to an increase in smallholder income.

C. Theory of change

19. The major challenge to boosting the growth of agriculture is the declining profitability of farming, due mainly to: (i) higher farm labour costs, attributable to the labour shortage resulting from a shift from farm labour to other, better-paying sectors and youth disinterest in farming; (ii) the inability to respond to climate events requiring an accelerated pace to complete farming operations on time and in tight periods; (iii) the inability to increase cropping area and cropping intensity due to the labour shortage; (iv) reduction in the recovery of produce due to the longer period required to harvest and vacate the field; and (v) the inability to use the moisture remaining after the *kharif* season to grow a second crop, due to delays in harvesting and evacuating harvest from the fields.
20. These challenges can be addressed through farm mechanization. The Government is actively pursuing farm mechanization with an ambitious plan to increase farm power availability to 3 kilowatts per hectare to meet the overarching objective of doubling farmers' income by 2022. However, more can be done to match agricultural mechanization solutions with location-specific needs and the availability of smallholder-centric technology that is relevant to women and hill/tribal farmers and enhances farmers' climate resilience. In order to address this situation, project interventions include: (i) strengthening ICAR's capacity in smallholder-focused AE research and development; (ii) setting up an innovation platform to support the development of new AE technologies from the concept stage to prototypes, the marketing of existing prototypes and the adaptation of existing AE technologies; (iii) building KVKs' capacity to conduct demonstrations and field days through well-trained lead farmers; (iv) promoting machinery after-sales and repair services; and (v) scaling up models to improve smallholder access to AE technologies by relying mainly on CIs' establishment and management of FMUs, CFCs and ATBs.

D. Alignment, ownership, and partnerships

21. **Alignment with Sustainable Development Goals (SDGs).** The project will contribute to the achievement of SDG 1 (no poverty), SDG 2 (zero hunger), SDG 5 (gender equality), SDG 7 (affordable and clean energy) and SDG 13 (climate action).
22. **Alignment with IFAD policies and corporate priorities.** The project is aligned with IFAD policies for mainstreaming gender, youth and climate. The project places considerable emphasis on reducing women's drudgery through the development of women-friendly AE technologies, considering the substantial and increasing role of women in agriculture. It will also increase women's access to resources through the promotion of FMUs, CFCs and ATBs. The project is therefore well-aligned with IFAD's Gender Action Plan 2019-2025. Finally, it will contribute to the IFAD Rural Youth Action Plan 2019-2021 by increasing the opportunities for business development and rural employment, tapping into the roles that young people can play in terms of technology uptake and the delivery of farm mechanization services, as well as machinery maintenance and repair services. At the country level, the project is aligned with the results-based COSOP 2018-2024, namely promoting remunerative and resilient agriculture.

23. **Ownership.** As the lead implementing agency, ICAR will be vested with the responsibility of project management, and it has conducted all the preparatory activities related to project design by holding a series of consultations on the project concept and implementation modalities and embarking on meeting the conditions for implementation readiness as required by the Department of Economic Affairs, Ministry of Finance and the Government of India.
24. **Partnerships.** The project will partner with the KVKs to demonstrate AE technologies, conduct farmer training and hold farmer-led farmers' field days. The project will also partner with the SRLMs, SDAs and other agencies at the state level involved in grass-roots institution-building efforts. Through collaboration with SMAM, the project will support CI procurement of the AE technologies that were successfully demonstrated.

E. Costs, benefits and financing

25. Component 1 was counted in part as IFAD adaptation finance. Component 2 is fully counted as IFAD mitigation finance. The total amount of IFAD climate finance for this project is estimated at US\$64,106,945, representing 96 per cent of IFAD's investment.

Project costs

26. The cost estimates for the SCATE project were based on the following key assumptions: (i) the six-year project commences implementation in fiscal year 2019-2020; (ii) all unit costs are input in Indian rupees; (iii) an average exchange rate of 70 Indian rupees to 1 United States dollar, and price contingencies of 5 per cent; (iv) investment and recurrent costs are categorized in accordance with the IFAD circular of 29 August 2013; and (v) taxes are excluded from IFAD financing. Project costs by component and financier are presented in table 1 below.

Table 1
Project costs by component and subcomponent and financier
(Thousands of United States dollars)

Component/ subcomponent	IFAD loan		IFAD grant		Banks		Government		Beneficiaries		Total
	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	Amount
Component 1: Participatory technology development											
1. Needs assessment	423.0	90.0	-	-	-	-	47.0	10.0	-	-	470.0
2. ICAR capacity-building	4 271.8	70.3	1 005.6	16.6	-	-	795.4	13.1	-	-	6 072.8
3. Innovation platform	5 888.6	60.2	-	-	-	-	3 892.7	39.8	-	-	9 781.4
Subtotal	10 583.4	64.8	1 005.6	6.2	-	-	4 735.1	29.0	-	-	16 324.2
Component 2: Business models for scaling up appropriate AE technologies											
1. Demonstrations of AE technologies	13 804.2	53.9	-	-	-	-	11 817.5	46.1	-	-	25 621.7
2. Support service development	3 151.0	80.9	-	-	-	-	431.3	11.1	313.0	8.0	3 895.3
3. Scaling up of AE technologies	31 935.9	47.3	-	-	5 726.0	8.5	20 237.6	30.0	9 589.8	14.2	67 489.3
Subtotal	48 891.0	50.4	-	-	5 726.0	5.9	32 486.5	33.5	9 902.8	10.2	97 006.3
Component 3: Project management											
1. Project implementation unit (PIU) and state-level project management units (SPMUs)	5 720.9	57.8	-	-	-	-	4 176.7	42.2	-	-	9 897.5
2. Project monitoring and evaluation, and knowledge management	891.5	85.4	-	-	-	-	152.3	14.6	-	-	1 043.8
Subtotal	6 612.4	60.4	-	-	-	-	4 329.0	39.6	-	-	10 941.4
Total project costs	66 086.9	53.2	1 005.6	0.8	5 726.0	4.6	41 550.6	33.4	9 902.8	8.0	124 271.9

Table 2

Project costs by expenditure category and financier

(Thousands of United States dollars)

<i>Expenditures</i>	<i>IFAD loan</i>		<i>IFAD grant</i>		<i>Banks</i>		<i>Government</i>		<i>Beneficiaries</i>		<i>Total</i>
	<i>Amount</i>	<i>%</i>	<i>Amount</i>	<i>%</i>	<i>Amount</i>	<i>%</i>	<i>Amount</i>	<i>%</i>	<i>Amount</i>	<i>%</i>	<i>Amount</i>
I. Investment costs											
A. Technical assistance	18 811.8	73.9	1 005.6	4.0	-	-	5 631.7	22.1	-	-	25 449.1
B. Equipment and materials	24 445.9	41.0	-	-	5 726.0	9.6	20 023.8	33.6	9 400.7	15.8	59 596.4
C. Training and workshop	13 981.4	80.5	-	-	-	-	3 393.6	19.5	-	-	17 375.0
D. Grants and subsidies	4 518.8	84.2	-	-	-	-	347.7	6.5	502.1	9.4	5 368.6
E. Goods, services and inputs	726.9	90.0	-	-	-	-	80.8	10.0	-	-	807.7
Total investment costs	62 484.8	57.5	1 005.6	0.9	5 726.0	5.3	29 477.6	27.1	9 902.8	9.1	108 596.8
II. Recurrent costs											
A. Salaries and allowances	-	-	-	-	-	-	8 274.7	100.0	-	-	8 274.7
B. Incremental operating costs	3 602.1	48.7	-	-	-	-	3 798.3	51.3	-	-	7 400.3
Total recurrent costs	3 602.1	23.0	-	-	-	-	12 073.0	77.0	-	-	15 675.1
Total project costs	66 086.9	53.2	1 005.6	0.8	5 726.0	4.6	41 550.6	33.4	9 902.8	8.0	124 271.9

Table 3

Project costs by component and subcomponent and project year

(Thousands of United States dollars)

<i>Components/Subcomponents</i>	<i>2020</i>	<i>2021</i>	<i>2022</i>	<i>2023</i>	<i>2024</i>	<i>2025</i>	<i>Total</i>
Component 1: Participatory technology development							
1. Needs assessment	107.6	85.3	83.1	87.3	91.7	15.0	470.0
2. ICAR capacity-building	51.4	1 187.1	1 363.5	1 351.8	1 259.2	859.7	6 072.8
3. Innovation platform	112.0	1 720.5	1 818.6	1 805.3	1 895.5	2 429.5	9 781.4
Subtotal	271.1	2 992.9	3 265.2	3 244.4	3 246.4	3 304.1	16 324.2
Component 2: Business models for scaling up appropriate AE technologies							
1. Demonstrations of AE technologies	5 975.3	8 089.4	3 828.3	3 485.8	2 574.4	1 668.5	25 621.7
2. Support service development	146.4	822.6	1 251.1	1 203.5	471.7	-	3 895.3
3. Scaling up of AE technologies	386.6	10 980.8	19 857.5	18 545.0	17 151.3	568.1	67 489.3
Subtotal	6 508.3	19 892.8	24 936.9	23 234.3	20 197.4	2 236.6	97 006.3
Component 3: Project management							
1. PIU and SPMUs	1 504.1	1 812.4	1 886.9	1 518.5	1 555.9	1 619.7	9 897.5
2. Project monitoring and evaluation, and knowledge management	190.9	191.7	196.3	142.7	132.1	190.1	1 043.8
Subtotal	1 695.1	2 004.1	2 083.2	1 661.2	1 688.0	1 809.8	10 941.4
Total project costs	8 474.5	24 889.8	30 285.3	28 139.9	25 131.8	7 350.5	124 271.9

Project financing and cofinancing strategy and plan

27. The total project costs of US\$124.27 million will be financed by: an IFAD loan in the amount of US\$66.1 million and an IFAD grant in the amount of US\$1.0 million; the Government's contribution equivalent to US\$41.55 million, including government counterpart funds covering taxes, ICAR contribution in the form of staff salary and convergence through SMAM equivalent; bank financing of US\$5.73 million equivalent; and the beneficiaries' contribution of US\$9.9 million equivalent. The IFAD loan will be on ordinary terms. The Government and ICAR contributions will be mobilized as part of the annual ICAR budget. The contribution from beneficiaries, banks and convergence with SMAM will be mobilized on a demand basis, and this will be linked to the effectiveness of the demonstrations and scaling-up partnerships.

Disbursement

28. IFAD loan and grant resources will be allocated to two expenditure categories in schedule 2 of the financing agreement: "investment costs" (a consolidation of technical assistance, equipment and materials, grant and subsidies, training and workshops, and goods, services and inputs); and "incremental operating costs". IFAD loan and grant resources will be disbursed in accordance with the agreed terms and conditions set forth in the financing agreement, the loan disbursement handbook and the letter to the recipient. These will require the submission of withdrawal applications listing the incurred eligible expenditures.

Summary of benefits and economic analysis

29. The project will reach some 400,000 households, or 2 million individuals. The average investment of IFAD sources of funds per household is estimated at US\$168. The overall internal rate of return is 18 per cent. The estimated net present value for a 7.5 per cent discount rate is 3.389 million Indian rupees and the benefit-cost ratio is 1.26. The switching value analysis indicates that the project is capable of sustaining a 26 per cent increase in costs and a 20 per cent decline in benefits.

Exit strategy and sustainability

30. This project's exit strategy is linked to mainstreaming technology development and the related demonstration and scaling-up efforts in the regular programme of AED-ICAR, KVKs and SDAs beyond project life. AED-ICAR will fund all activities related to participatory technology development from year 6 of the project onward. The project has developed a new state-level framework for collaboration between ICAR institutions and the SDAs to integrate project support with state government farm mechanization efforts. The project's strategy of leveraging the capacity of existing CIs, supported by SRLMs and other partner agencies, will also facilitate a seamless exit.
31. **Sustainability.** The farm mechanization units established by the CIs must be profitable to achieve sustainability. The project has developed measures for a sound management system, the availability of adequate after-sales service and accelerated adoption of AE technology.

III. Risks**A. Project risks and mitigation measures**

32. The overall project risk is rated as moderate. The main risks are related to institutional capacity for implementation, financial management and procurement. Mitigation measures consist of the following: (i) for implementation capacity, the PIU will prepare an inventory of technologies focusing on needs of the target group, promote participatory technology development with farmers and work with CIs already involved in savings and loan activities and linked with banks to scale up the adoption of AE technologies; (ii) for financial management, the project implementation manual details the financial management procedures, which build on existing ICAR systems, centralize processes in the PIU, and incorporate external and internal audits and provisions for hiring qualified staff; and (iii) for procurement, the PIU will prepare annual procurement plans and use standard bidding documents that contain the bidding process/clarifications/evaluation, complaint handling and dispute resolution mechanisms as well as the provisions of the IFAD Policy on Preventing Fraud and Corruption in its Activities and Operations. It will also prepare and adopt the procurement manual and hire qualified procurement staff.

B. Environment and social category

33. The project is classified as category B in the environmental and social category. Risk mitigation measures include: (i) access by small and marginal landholders to machinery for conservation agriculture; (ii) the exclusion of districts/blocks/villages

with ecologically sensitive areas and forest buffer zones from the project area; (iii) adaptation of machinery for ease of use by women; (iv) the scaling up of affordable technologies and delivery of machinery services through custom hiring/rental services. The introduction of fossil-fuel-driven AE technologies is expected to increase greenhouse gas emissions, but the Ex-Ante Carbon-balance Tool analysis conducted indicates a negative carbon balance as a result of other climate-positive changes, such as the replacement of draft animals and the use of machinery powered by renewable energy (especially for agroprocessing).

C. Climate risk classification

34. The climate risk is classified as high. The future climate scenario projects overall warming in all five states, with an increase of 1 to 1.5°C in maximum and minimum temperatures by mid-century. A marginal to moderate increase in rainfall is expected, accompanied by an increase in the warm spell duration indicator, consecutive dry days and wet days. In agricultural terms, this means uncertain rainfall in terms of the onset of the monsoon and distribution over the crop cycle; there is a high likelihood of an increased incidence in crop/livestock/forest pests and diseases and health risks for farmers, namely women, working in the fields under harsh conditions. Mitigation measures include: (i) promoting conservation agriculture; (ii) converging project implementation with the self-help groups, village organizations and CIs involved in the development of small-scale irrigation; (iii) extending IT-based advisory services to the project target group. An in-depth climate risk analysis was not deemed necessary, as India has a large database of climate risk information and related studies.

D. Debt sustainability

35. The last International Monetary Fund Article IV consultation in India in August 2018 noted that there is limited fiscal space, as debt is close to thresholds that increase the likelihood of debt distress among emerging market economies. India's debt is high, with a debt-to-GDP ratio of around 70 per cent of GDP; however, favourable debt dynamics and financial repression make the debt path sustainable. Risks are further mitigated because public debt is denominated in domestic currency and held predominantly by the public. Public debt accounted for 89.5 per cent of total outstanding liabilities at end-December 2018, with internal debt and external debt having shares of 83.3 and 6.2 per cent, respectively. Rollover risk in the debt portfolio continues to be low.

IV. Implementation

A. Organizational framework

Project management and coordination

36. At the central level, the Ministry of Agriculture and Farmers' Welfare will be the nodal agency. ICAR, which is under the Ministry's Department of Agricultural Research and Education, will be the lead implementing agency. The PIU will be housed in the AED-ICAR. The Deputy Director-General of AED will be the project director. ICAR will designate senior staff and hire independent contractors for project management and implementation. The project will establish an SPMU in each project state within the SDAs. The SDA directors in the targeted states will be the state project directors. Demonstration activities will be conducted by KVVKs, and scaling-up activities will be undertaken by the SRLMs and other partner agencies identified by the state government. The project will establish a two-tier coordination structure at both the central and state level.

Financial management, procurement and governance

37. The overall inherent country financial management risk is assessed as moderate, with a score of 41 on Transparency International's Corruption Perceptions Index 2018. The 2018 rural sector performance score of 4.40 is also in the moderate risk bracket. The PIU in the AED-ICAR will be responsible for financial management.

The initial financial management risk is assessed as high due to the spread-out nature of the project; however, the World Bank has been working with ICAR for many years, and IFAD has direct experience working with four of the five project states. Mitigating measures should soon bring this risk down to moderate. Competent staffing comprised of ICAR permanent staff and contractors will be hired. A designated IFAD loan and grant account will be opened in United States dollars. As an exception to the General Conditions for Agricultural Development Financing, an allocation of US\$1.0 million will be made for retroactive financing, and a start-up advance will also be permissible. The project will hire independent chartered accounting firms to perform internal and external audits, the latter in accordance with IFAD's Handbook for Financial Reporting and Auditing of IFAD-financed Projects. The loan will be on ordinary terms, denominated in United States dollars, with a variable spread and an 18-year maturity, including a three-year grace period; the proposal is in line with recent World Bank loans for agricultural development in India. All project procurement will follow IFAD's Project Procurement Guidelines. The competent independent authority for receiving, reviewing and investigating allegations of fraud and corruption will be the Chief Vigilance Officer of ICAR, who reports directly to the Director-General of ICAR.

B. Planning, monitoring and evaluation, learning, knowledge management and communications

38. The PIU will be responsible for preparing the annual workplan and budget, including the plans and budgets of all partners. The project will set up a management information system to monitor physical and financial progress and progress toward output targets. Annual outcome surveys will be conducted to assess the achievement of outcome targets. The project will also conduct a baseline study, an impact assessment at midterm and completion and thematic studies. The project will generate and disseminate knowledge through regular knowledge products and the creation of a webpage on the ICAR website for uploading the knowledge generated.

Innovation and scaling up

39. The project design includes three innovations and their scaling up, as described below:
- (i) This project will hold national technology forums, issue awards for best AE research, provide fellowships for conducting AE research in key identified areas, and fund AE research through a competitive grant facility that includes technology challenges to showcase prototypes. All these activities will bring public and private research entities together to address the needs of smallholders, with a focus on women, hill/tribal farmers and climate-centric technologies.
 - (ii) The project will develop a two-stage demonstration process involving the training of lead farmers by KVKs and other training institutions and lead farmer-led field days to demonstrate the technologies. This will be coupled with third-party verification of the field days by CIs.
 - (iii) The project will test a dual incentive modality consisting of a subsidy for machinery acquisition and a user expansion incentive to increase ownership of AE machinery and improve utilization capacity.

C. Implementation plans

Implementation readiness and start-up plans

40. An allocation of US\$1.0 million will be made for retroactive financing (covering the period from 1 August 2019 to the date of entry into force). A start-up advance will also be permissible. These two measures combined will help AED-ICAR comply with the Government's and IFAD's readiness requirements.

Supervision, midterm review and completion plans

41. The project will be directly supervised by IFAD. Annual supervision missions will be conducted, the first of them envisioned toward the end of the first year of the project's entry into force. The midterm review will be conducted by IFAD and the Government by the end of the third year of the project to review project achievements and implementation constraints. As the project reaches its completion point, the PIU will be required to prepare a draft project completion report. IFAD and the Government will then conduct a project completion review based on the information provided in the project completion report and other data.

V. Legal instruments and authority

42. A project financing agreement between the Republic of India and IFAD will constitute the legal instrument for extending the proposed financing to the recipient. A copy of the negotiated financing agreement will be tabled at the session.
43. The Republic of India is empowered under its laws to receive financing from IFAD.
44. I am satisfied that the proposed financing will comply with the Agreement Establishing IFAD and the Policies and Criteria for IFAD Financing.

VI. Recommendation

45. I recommend that the Executive Board approve the proposed financing in terms of the following resolution:

RESOLVED: that the Fund shall provide a loan and a grant to the Republic of India, with the loan on ordinary terms in the amount of sixty-six million one hundred thousand United States dollars (US\$66,100,000) and the grant in the amount of one million United States dollars (US\$1,000,000) and upon such terms and conditions as shall be substantially in accordance with the terms and conditions presented herein.

Gilbert F. Hougbo
President

Negotiated financing agreement

(To be tabled at the session)

Logical framework

Results Hierarchy	Indicators				Means of Verification			Assumptions
	Name	Baseline	Mid-Term	End Target	Source	Frequency	Responsibility	
Outreach Number of households reached	1.b Estimated corresponding total number of household members				Project monitoring	Semi-annually	PIU	
	Household members - Number of people		1 000 000	2 000 000				
	1.a Corresponding number of households reached				Project monitoring	Semi-annually	PIU	
	Households - Number		200 000	400 000				
	1 Persons receiving services promoted or supported by the project				Project monitoring	Semi-annually	PIU	
	Males - Number		50 000	100 000				
	Females - Number		150 000	300 000				
Indigenous people - Number		100 000	200 000					
Total number of persons receiving services - Number of persons		200 000	400 000					
Project Goal Enable smallholders to increase farm income through the use of appropriate AE technologies	Percentage of households reporting more than a 25% increase in income				Impact assessment	At baseline, mid-term and completion	PIU	Sustained govt. policies to promote farmers' incomes and welfare
	Households - Percentage (%)		25	70				
Development Objective Increased labour and farm productivity through the adoption of AE technologies.	Percentage increase in farm power (KW/Ha)				Impact assessment	At baseline, mid-term and completion	PIU	Government's farm mechanization expansion policies continue and converge, and SCATE successfully converges with the related programs and schemes
	Percentage over baseline - Percentage (%)		7	20				
	No. of households reporting a 50% reduction in labour costs and a 15% increase in farm productivity				Annual outcome survey	Annual	PIU	
	Households - Number		159 500	318 600				
	Indigenous households - Number		79 750	159 300				
	Percentage of women reporting a decrease in drudgery-related workload.				Annual outcome survey	Annual	PIU	
	Percentage - Percentage (%)		25	40				
Women's Empowerment in Agriculture Index	TBD	TBD	TBD	Annual outcome survey	Annual	PIU		
Number of tons of greenhouse gas emissions (CO2) avoided and/or sequestered/year	TBD	TBD	(46,522)	Impact assessment	At baseline, mid-term and completion	PIU	Climate resilience is an important criterion in the selection of research/demo/scaling up technologies	
Outcome 1: Reduced mismatch between needs and availability of smallholder- centric AE technology	Percentage of technologies developed to address the needs of smallholders, hill farmers, women, Energy Efficiency (EE) and CA				Project monitoring	Semi-annually	PIU	
	Percentage - Percentage (%)		30	50				
Output 1.1. Region-specific list of existing AE technologies with low dissemination	No. of region-specific lists of existing AE technologies with low dissemination				Project monitoring	Quarterly	PIU	
	Number of regions - Number		15	30				

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Results Hierarchy	Indicators				Means of Verification			Assumptions
	Name	Baseline	Mid-Term	End Target	Source	Frequency	Responsibility	
	No. of fellowships to young innovators				Project monitoring	Quarterly	PIU	
	Males - Number		10	25				
	Females - Number		10	25				
	Youth		20	50				
Output 1.2. Innovation platform up and running	No. of concept-to-prototype technologies supported				Project monitoring	Quarterly	PIU	
	Number - Number		7	35				
	No. of machinery customizations supported				Project monitoring	Quarterly	PIU	
	Number - Number		15	75				
	No of prototypes supported for commercial development				Project monitoring	Quarterly	PIU	
	Number – Number		7	35				
Outcome 2: Increased access and adoption of AE technologies for farm production and post-harvest processing	3.2.2 Households reporting the adoption of environmentally sustainable and climate-resilient technologies and practices				Annual outcome survey	Annual	PIU	(1) Effective coordination between implementing agencies for scaling up with community institutions; (2) Community organizations effectively manage AET rental and use
	Households - Percentage (%)		30	70				
	2.2.4 Supported rural farmers' organization members reporting new or improved services provided by their organization				Annual outcome survey	Annual	PIU	
Percentage of FO members - Percentage (%)		40	80					
Output 2.1. Demonstration and support service development implemented	1.1.4 Persons trained in production practices and/or technologies				Project monitoring	Quarterly	PIU	Effective convergence with government schemes promoting good agronomic practices for climate-resilient agriculture
	Males - Number		1000	2000				
	Females - Number		1000	2000				
	Youth		1000	2000				
	3.1.3 Persons accessing technologies that sequester carbon or reduce greenhouse gas emissions				Project monitoring	Quarterly	PIU	
	Males - Number		30000	60000				
	Females - Number		90000	180000				
	Indigenous people - Number		60000	120000				
	No. of youth trained in repair and maintenance				Project monitoring	Quarterly	PIU	
	Males - Number		50	85				
	Females - Number		50	85				
	No. of agricultural tool banks established							
	No. of existing custom hiring centres supported							
No. of post-harvest processing units established								