

## Leveraging ICT for Irrigated Agricultural Information Technical Assistance Concept Paper

**Date: 20 April 2017**

1. Country partnership strategy (CPS):	
<ul style="list-style-type: none"> <li>• Year included in CPS/RCS/COBP/RCOBP/CPS or RCS midterm review report: 2016</li> <li>• Document reference number and date approved: IN.425-16, 24 October 2016</li> <li>• In case of change in the TA title, type, or amount, please state reason: Formerly: Improving Rural Infrastructure Planning and Asset Management through Technological Innovation. Suggested to update title to align more closely with the outcome and outputs.</li> </ul>	
2. TA Type	3. Cluster:
<input checked="" type="checkbox"/> CDTA <input type="checkbox"/> R-CDTA <input type="checkbox"/> PATA <input type="checkbox"/> R-PATA <input type="checkbox"/> RDTA <input type="checkbox"/> R-RDTA	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
4. Categorization of TA: <input type="checkbox"/> Category A TA <input checked="" type="checkbox"/> Category B TA	
5. Merits for using the TA approach over the grant-financed TA approach: Not applicable	
6. Coverage	
<input checked="" type="checkbox"/> Country <input type="checkbox"/> Subregional <input type="checkbox"/> Interregional    Indonesia	
7. For RDTA: Medium-Term Corporate Strategic Priorities for Research:	
<input checked="" type="checkbox"/> Promoting Inclusive Growth <input type="checkbox"/> Address increasing commodity price <input type="checkbox"/> Addressing Climate Change <input type="checkbox"/> Demographic Change <input type="checkbox"/> Regional Integration <input type="checkbox"/> Other	
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10. Department/Division: SERD (IRM/SEER)	
11. Key Development Issues to be addressed:	
<p><b>The development problem.</b> Agriculture plays an important role in Indonesia's efforts to improve food security, reduce poverty and promote inclusive growth.<sup>1</sup> Agriculture employs 39 million people, which is almost 33% of the total workforce and is the main source of employment in rural areas.<sup>2</sup> In 2014, about 13.8% of the rural population was classified as poor, compared to 8.2% of the urban population.<sup>3</sup> But, productivity in agriculture at \$3,000 per worker (annual average) is very low compared to neighboring countries like Malaysia, where value added per worker is \$9,000.<sup>4</sup></p>	

<sup>1</sup> GDP growth that originates from agriculture is estimated to be at least twice as beneficial for the poorest segment of the country as growth from non-agricultural sectors. The International Bank for Reconstruction and Development/ the World Bank. 2008. *World Development Report 2008, Agriculture for Development*. Washington, DC.

<sup>2</sup> In August 2014, the 'employed' population in agriculture, forestry, hunting and fishery already account for 39 million people. ILO, 2015. *Labor and social trends in Indonesia 2014 - 2015: Strengthening competitiveness and productivity through decent work*. Jakarta.

<sup>3</sup> ADB. 2015. *Summary of Indonesia's Poverty Analysis*. Manila.

<sup>4</sup> McKinsey Global Institute. 2012. *The Archipelago Economy: Unleashing Indonesia's Potential*.

Efforts to boost agricultural productivity require increasing smallholder yields; putting unused low carbon land into production; focusing production on high value crops; and developing the agro-industry and reducing post-harvest and value chain waste. These investments are important to optimize agricultural production, increase farm incomes and rural employment with knock on positive impacts on the growth of the non-farm sector.

Agriculture is dominated by smallholder farmers. Over 90% of the crops produced are cultivated by smallholders with the exception of oil palm. The main crops are rice, soybean, corn, coffee, cocoa, fruits and vegetables, which are high value tropical produce and offer strong prospects to smallholders. But, smallholders face challenges in increasing productivity and commercialization of their produce. Key issues in enhancing smallholder agricultural productivity and diversification, correspondingly their incomes and welfare, is addressing their inadequate access to value/ supply chain inputs, quality irrigation infrastructure, finance, and access to extension technology, services and information.

In recent years, the Government of Indonesia (the government) has undertaken a range of investments to strengthen irrigation management and agricultural value chain development.<sup>5</sup> Yet, millions of smallholder farmers are unable to maximize opportunities and capture the economic benefits of these investments. One key constraint or gap is insufficient exchange and access to up-to-date extension information.

Farmers need access to and exchange of up-to-date information on (i) local sources, availability and costs of inputs for production to minimize their dependence on middle person/ intermediary; (ii) different techniques and technologies for increasing productivity and diversifying into more commercial crops; (iii) real-time weather information, cropping patterns, as well as soil and water management to cope with climate variability; (iv) crop and food processing to add value to their raw produce; (v) food storage to minimize post-harvest losses; and, most importantly; (vi) marketing and links to markets to maximize profitability.

They also need information on the role and responsibilities of different institutions at the national and local levels on the provision of key services, specifically the various value chain service providers, finance and where to go and who to ask for more specific information, including on participatory water management at scheme level and irrigation infrastructure related operation and maintenance issues. At the same time the government needs more feedback on the viability of its investments and policies, such as operation and maintenance requirements and services for irrigation infrastructure.

On the supply side, the information flow and exchange from the government rely on traditional extension services approach under which extension workers travel to rural areas to train and disseminate information to farmers about improved practice on new technologies, inputs, farm, soil and water management – has limitations in terms of reach and quality. While there are 28,000 government extension workers to support 71,000 agricultural villages,<sup>6</sup> there is a wide disparity in the educational and experiential backgrounds of the extension workers. Key constraints faced by extension workers in reaching farmers include:

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<sup>5</sup> ADB. 2016. *Report and Recommendation of the President to the Board of Directors: Proposed Loan to Indonesia for the Integrated Participatory Development and Management of Irrigation Program*. Manila.

<sup>6</sup> Extension workers include both civil servants and contractual extension workers.

(i) limited technology training and access to information, (ii) inadequate communication skills, (iii) insufficient budget for transport to reach farmers spread out in large areas, and (iv) limited monitoring capacity.<sup>7</sup> Lack of appropriate incentives, recognition of, and limited monitoring capacity result in low levels of extension worker accountability to the farmers they serve. In addition, with only 45% of the nation's irrigation system functioning at its full capacity, there is a key need to enhance real time information exchange between farmers, water user associations and, irrigation commissions to support efficient operation and maintenance of irrigation systems.

Decentralization has also weakened the agricultural public extension system and heightened the gaps and disparities among regions. It is difficult to disseminate information and coordinate national and regional extension office activities. The onus is on local governments to provide funding for their extension offices, and many have chosen to place priority on other sectors, which contribute directly to revenue for the local government.<sup>8</sup> The impact of this fragmented institutional set up combined with the lack of information further limit the ability of many farmers to escape poverty.

**Current and past ICT-based agricultural and irrigation information initiatives.** Several initiatives have been undertaken by the government, NGOs, universities and the private sector. The Cyber Extension/e-petani is a national web-based agricultural information portal (except in Eastern Indonesia), currently run by the Ministry of Agriculture (MOA) for farmers and extension workers at the district level through the 5,568 rural extension centers.<sup>9</sup> Key challenges of Cyber Extension include: (i) financial sustainability and the need to support Cyber Extension operational costs and travel costs for extension workers to access the system; and (ii) weak capacity of district/sub-district administrators and extension workers in using the system to complement their roles and responsibilities. The AgriFin Mobile program is supported and endorsed by MOA and implemented by Mercy Corps and Swiss Development Cooperation (SDC). The TA provides bundled and customized farm and crop management tools and financial services to smallholder farmers using both regular and android phones.<sup>10</sup> The Poor Farmers' Income Improvement through Innovation TA, completed in 2011, was collaboration between MOA and the Asian Development Bank (ADB) to set up a national farming website. There have also been various web-based ICT initiatives in agriculture and irrigation by the private sector<sup>11</sup> and by universities.<sup>12</sup> The proposed TA will coordinate with Support for Incorporating Digital Communications in Access to Finance (SIDCAF) to potentially overlap pilot locations, provide access to mobile financial services to farmers and share substantive content on cutting edge agricultural technologies on TA supported crops.<sup>13</sup>

The irrigation asset management information system (IAMIS) software of Ministry of Public Works and Hygiene (MPWH) is being upgraded to a web based interface to allow easier planning and

<sup>7</sup> Most are able to provide very general extension information and lack extension information and skills in high value commodities.

<sup>8</sup> *Agricultural Extension in Indonesia: Current Status and Possible Ways to Meeting Emerging Challenges*, Djuara P. Lubis.

<sup>9</sup> World Bank 2013, Implementation Completion and Results Report, *Farmer Empowerment through Agricultural Technology and Information TA (FEATI)*.

<sup>10</sup> Collaboration includes: Mercy Corps, NGO coordinator for the TA, provides financial literacy training to beneficiaries; 8 Villages handles application development and coordinates the delivery and training on various applications; Gajah Mada University supports content development, training and field visits to locations; and Syngenta supports seeds and agri chemicals/ inputs and provides market links. Key facilities: (i) 160-character daily tips for regular phones; (ii) 500-character tips, pictures and video on smart phones; (iii) provision of expert advice to farmer queries; (iv) e-banking services, including database on farmer profiles; crop insurance facilities, etc. Mercy Corps. 2016. *AgriFin Mobile TA, Product Development and Defining the Stages of Bundling*.

<sup>11</sup> ICT initiatives in agriculture have also been developed by a number of start-up companies including 8 villages, Eragano, iGrow, Karsa, Pantau Harga, Kecipir, TaniHub, Lima Kilo, Sikumis, CI, etc. As part of People's Economy Synergy Program, Ministry Rudiantara of Kominfo launched 5 Applications in April 2016: Petani, TaniHub, LimaKilo, Pantau, and Nurbaya Initiatives.

<sup>12</sup> This includes among others the web based initiative developed by the Bogor Agriculture University.

<sup>13</sup> The proposed TA differences with SIDCAF: (i) SIDCAF will provide mobile/ ICT based financial services to farmers to process agricultural goods and linkage with export markets; and (ii) the agricultural commodities supported are different and include tuna, shrimp, patchouli oil, etc.

management of irrigation systems. However only 20% of national schemes assets are registered. Moreover, the current information system doesn't allow public participation to enrich information. This system could benefit from other initiatives such as the Qlue, Lapor, and Smart Cities Application initiated by various Local Government, under which communities could report on infrastructure quality and improve reporting and performance of government investment

**Lessons.** The TA draws upon ADB, the government, development partners' and other previous initiatives' knowledge base and experience. A key lesson is that there is a high demand for improved provision of information to farmers. A key consideration is the provision of information in an appropriate format and language, and that rural communities have the capacity to access, analyze and act on it. Mobile usage is popular in rural areas and among farmers and extension workers.<sup>14</sup> Farmers and extension workers acknowledge that cellphones are the key tool to reach many farmers, widen farmer information and marketing networks and that information would be faster to access. In 2012, with 180 million mobile phone users (75% of the population), Indonesia is the fourth largest mobile user in the world after China, India and USA. In addition, approximately, 61.9 percent of the internet users use their cell phone for it.<sup>15</sup> Farmers are using the cell phone for information sharing with other farmers, marketing, and to access information on agricultural technology, as well as a camera. Other lessons from previous and ongoing projects highlight that: (i) any intervention should be financially affordable for farmers and commercially viable for the various stakeholders for long term sustainability; (ii) engagement of the private sector is essential to provide cutting edge, up to date information; (iii) ongoing modifications are necessary for substantive content and product development to meet farmers' needs; (iv) any ICT intervention should be user friendly, reliable and backed by trusted, neutral sources of information<sup>16</sup>; and (v) a participatory approach, engagement and close coordination with farmers and key stakeholders will create ownership and lead to sustainability.<sup>17</sup>

## 12. TA Description:

The proposed TA builds on and strengthens the outcomes of the proposed loan - Integrated Participatory Development and Management of Irrigation Program (IPDMIP), cofinanced by the International Fund for Agricultural Development to maximize the investments on infrastructure development, value chain services and improving the delivery of extension information to farmers and building capacity of extension workers.<sup>18</sup> The TA fills a key gap of insufficient access to extension information. The TA proposes to strengthen the existing use of ICT, in particular mobile phones, to deliver tailored extension information services, and to support higher rural productivity. The TA will provide regular low cost, timely and actionable extension information to the smallholder farmers specific to their needs to increase their ability to improve yields. The model will support peer exchanges among farmers and build mobile based farming services and networks through which farmers can benefit from the experience of other farmers in their own and other villages. The ICT model will also support information and skill building of extension workers in cultivating high-value commodities and post-harvest management. The application will develop local specific platforms/ linkages with value

<sup>14</sup> Indonesia is one of the fastest growing markets for cellphones and using mobile internet, except for Papua where internet and mobile is scant. Cellphones are affordable; in Java and Bali, there is sufficient competition and demand which has led to lower prices. USAID. 2010. *Indonesia ICT assessment: Using ICT to Increase the Success of USAID/Indonesia's Agriculture Sector Programs*. Indonesia.

<sup>15</sup> *Agricultural Extension in Indonesia: Current Status and Possible Ways to Meeting Emerging Challenges*, Djuara P. Lubis.

<sup>16</sup> Despite low levels of satisfaction with the infrequent support of the extension workers, farmers still reported that they trusted this source backed by the government more than any other source. Mercy Corps. 2013 *Agri-Fin Mobile Product Development and Baseline Research Report*. Indonesia.

<sup>17</sup> ADB. 2011. *TA Completion Report: Poor Farmers' Income Improvement through Innovation TA*. Manila.

<sup>18</sup> IFAD is providing parallel financing to the Ministry of Agriculture (MOA) for improved delivery of agricultural services to maximize the benefits of the irrigation improvements.

chain service providers, including farmers, input providers, processing facilities, traders, and buyers or markets.

a. Link to Country Partnership Strategy/Regional Cooperation Strategy:

The TA is aligned with the Government's priority to increase yields and ensure food security, support inclusive growth and reduce poverty as highlighted in the Government's 2000-2025 long-term National Development Plan (RPJPN)<sup>19</sup> and 2015-2019 National Medium Term Development Plan (RPJMN).<sup>20</sup> The TA is also aligned with the priorities of ADB's country partnership strategy, 2016–2019 for Indonesia, which aims to improve the delivery of rural and water infrastructure investment.<sup>21</sup> The TA is included in ADB's country operations business plan, 2017–2019 for Indonesia. It is aligned with Operational Plan for Agriculture and Natural Resources, 2015–2020<sup>22</sup> as well as the strategy paper prepared jointly by the government and ADB: Strategic Vision for Agriculture and Rural Development, 2006. The TA is also aligned to ADB ICT strategy. It will coordinate closely with other development partner interventions.

The TA will complement and add value to the ADB and IFAD supported program by leveraging ICT to improve the delivery of agricultural services in innovative ways by empowering farmers with knowledge and linkage to networks and institutions and allow them to effectively capture the benefits of infrastructure and value chain development.<sup>23</sup> TA locations will overlap with ADB and IFAD supported programs in 3 districts to identify areas, crops and strategic value chains which have high potential for improved production, increased profitability and higher income for smallholders.<sup>24</sup> Data will build on existing initiatives to be identified during formulation of the strategy. The TA will also build on the work of the agricultural research institute (BPPT) as well as explore other trusted and experienced service providers such as the Bogor Agricultural University and the Gajah Mada University, in Indonesia. It is proposed to synergize the activities with existing instruments – such as the irrigated agriculture management plans – for information on yearly cropping plan as well as crop specific information according to land types and needed solutions tailored to farmer specific budgets/demands.

The TA will develop a model for sustainable and scalable innovative technical ICT solutions for increasing productivity and efficiency that may be applicable to the whole sector. Key innovative elements will include: (i) provision of local specific market information and linkages with markets; (ii) platform to support a value chain group; (iii) a platform to link farmers with irrigation authorities; and (iv) a public-private partnership model to support mobile based agricultural information to smallholder farmers that is technically and financially viable and can lead to mass uptake commercially.

The key factors that will support sustainability of the TA include the following: (i) the need-based and demand driven nature of the TA. There is keen interest in the government to pilot innovative solutions for reaching larger numbers of farmers with information; (ii) implementation of an exit strategy that supports financial and commercial viability for key stakeholders in the value chain;<sup>25</sup> (iii) consultation and effective engagement of farmers, extension workers, research institutes, ICT and mobile network

<sup>19</sup> Government of Indonesia. 2005. *Long-term Development Plan: RPJPN 2005-2025*. Jakarta.

<sup>20</sup> Government of Indonesia. 2015. *Medium-term Development Plan: RPJMN 2015-2019*. Jakarta.

<sup>21</sup> ADB. 2016. *Country Partnership Strategy, 2016–2019: Towards a Higher, More Inclusive and Sustainable Growth Path*. Manila.

<sup>22</sup> ADB. 2015. *Operational Plan for Agriculture and Natural Resources, 2015–2020*. Manila.

<sup>23</sup> Proposed Integrated Participatory Development and Management of Irrigation Program (RRP INO 43220).

<sup>24</sup> To be determined by the assessment in the initial phase of TA implementation.

<sup>25</sup> Exit strategy will be based on (i) an agreement with mobile network operator for provision of an affordable internet package based on farmers' and extension workers willingness to pay (Discussions highlight that extension workers are willing to pay USD 10-15 and farmers USD 5 to 10, monthly for use of mobiles); and (ii) simulation of agri-fair price trade and minimal transaction fees levied on key stakeholders at various points of the value chain, except for farmers, e.g., buyers or market, input providers, commercial banks for farmer profiles, etc. to ensure long term sustainability.

providers and other key stakeholders are key features of the TA to ensure that developed models are accepted and owned by the key beneficiaries and stakeholders; (iv) a strong M&E system to ensure needed results are achieved; and (v) capacity building of all stakeholder institutions and building of national champions along with parallel training and support to farmers in utilizing ICT services will enhance sustainability.

b. Impact

Improved rural incomes, enhanced food security and improved livelihoods (2015-2019 National Medium Term Development Plan and 2005-2025 long-term National Development Plan).

c. Outcome

The outcome will be improved management of agricultural extension information services in three districts in rural Indonesia.

d. Outputs

**1. Model and strategy developed for using ICT for agricultural information exchange.** This output will: (i) review past and ongoing initiatives on use of ICT in agriculture by public and private extension service providers and lessons from Indonesia and global interventions covering technology, institutional, financial and economic aspects, including constraints, key for success and upscaling potential; (ii) consult and identify the specific knowledge requirements of the farmers and constraints in access to information; (iii) conduct consultations with relevant agencies and private providers; (iv) develop criteria and identify TA locations and beneficiaries; (v) build on the existing government and other models and identify the appropriate technologies to process and deliver this knowledge and assess its technological, financial and social sustainability; (vi) assess the feasibility of such technologies from institutional, financial and economic perspectives; (vii) develop a framework for public private partnerships in the delivery of ICT services; and (viii) propose a capacity development plan in the use of the ICT services by extension workers and farmers. Gender issues to be mainstreamed in assessments and approach.<sup>26</sup>

Product services will include among others: (i) week wise location specific weather forecasts service; (ii) price information of commodities in the closest wholesale markets; (iii) location specific availability of agricultural inputs (seeds, fertilizer, pesticides, etc.); (iv) techniques and technologies to increase productivity and soil and water management relevant to specific crops; (v) contact information of extension agents, input suppliers, markets or buyers and financiers (for access to credit locally); (vi) customized extension support (voice communication) to farmer queries by mobile applications backed by help a line with expert support and a framework for implementing the helpline; (vi) develop platforms to interface with farmers' and or peer groups, value chain service providers, irrigation authorities, and markets or buyers; (vii) irrigation related periodic report and repair work status; (viii) develop and implement a knowledge management approach for above collected data to generate useful reports for public and private agriculture extension and related stakeholders, including databases on farmer profiles, queries, and survey reports; and (ix) a mechanism to monitor and rate the performance of mobile applications, the help line and quality of their advice.

**2. Context specific, low cost, timely and actionable extension information piloted:** This output will implement the model/ strategy in 3 districts. Approximately 100,000 farmers will be reached with the TA services in the selected districts.<sup>27</sup> Key activities will include (i) an agreement between relevant ministries, mobile network providers, and relevant private sector partners to provide a financially

<sup>26</sup> Women's participation in agriculture is approximately 40%.

<sup>27</sup> It is assumed that each district will have the following farmers' number in average: (i) 80,000 farmers per district in Java, (ii) 10,000 per district in Sumatra and (iii) 10,000 per district in Eastern Indonesia.

feasible package for farmers and extension workers; (ii) application upgrading and substantive content development; (iii) developing and testing standard operating procedures for various products and/or services; (iv) developing training of trainers, and capacity development activities for the applications and/or services, including financial literacy for agricultural training institutes, Cyber Extension staff at national level, extension workers and farmers; (v) field facilitation and monitoring of all activities; and the (vi) development and maintenance of M&E database, including farmers' profiles.

**3. Effective M&E and use of information for policy advocacy for irrigated agriculture and TA management.** This output will (i) analyze M&E data emanating from the TA, IPDMIP and other interventions to identify and undertake thematic studies on key issues related to strengthening implementation and informing evidence based policy advocacy on irrigation and agriculture pertinent to the whole sector – in support of the IPDMIP Knowledge Management Centre; (ii) provide capacity development to government staff; (iii) establish TA performance and management systems; (iv) develop and implement an exit strategy; as well as (v) provide supervision and technical expertise to ensure effective TA implementation, knowledge transfer and execution of the TA's exit strategy. In addition, the TA will build linkages with key local agencies and stakeholders.

13. Risks: The integrated benefits and impacts of the TA are expected to outweigh the costs. Key risks include: (i) inadequate assessments of and corresponding plans for financial feasibility and commercial viability of the various activities are not undertaken; (ii) lack of commitment and engagement of the various government and private sector stakeholders to activities; (iii) inadequate coordination with government counterparts and key stakeholders for the delivery of TA activities and outputs. During strategy development in the first phase of implementation, the TA will assess financial feasibility for farmers and extension workers and willingness to pay for mobile/internet package and implement appropriate agreements with mobile network operators. The TA will also implement exit and sustainability strategy to ensure commercial viability of supply side service providers by levying minimal transaction fees on value chain service providers, buyers and micro-finance institutions for linkages with farmers and extension workers. To address risks (ii) and (iii), broad-based and meaningful consultations with a wide range of stakeholders, including, key government agencies; farmers and farmers' groups, related value chain service providers; mobile network operators and IT applications development agencies; development partners; local agricultural extension associations; women's and youth networks will be an integral part of TA preparation, implementation and monitoring.

14. Implementation Arrangements

a. Proposed executing agency

The proposed executing agency will be the Directorate of Water Resources and Irrigation and Directorate of Food and Agriculture, National Development Planning Agency (BAPPENAS). BAPPENAS has been identified as the EA because BAPPENAS is the key architect in formulating the loan and is the IA for- IPDMIP and this TA supports and enhances outcome of IPDMIP. Coordination among various agencies at the sub- national level is required for TA to be successful. BAPPENAS has a critical coordinating role at the national and sub-national level. The proposed innovative TA was also requested by BAPPENAS. The Ministry of Agriculture (MOA) and the Ministry of Public Works and Housing (MPWH) will be the implementation agencies. For MOA, the dedicated agency focal will be the National Center for Agricultural Extension (NCAE) and Center for Agricultural Data and Information (CADI). MOA oversees the development of agriculture in Indonesia and provides technical guidance on agricultural activities at both the national and subnational levels. The MPWH will be the focal for the irrigation reporting system. The Ministry of Home Affairs (MOHA) will

be a key agency which will be actively involved in planning and implementation of the TA to ensure the integration of relevant ICT-based extension activities with provincial and district level agricultural agencies. A steering committee supported by BAPPENAS will provide overall strategic and policy guidance. The TA will engage and coordinate with the Badan Pengkajian dan Penerapan Teknologi (BPPT) Badan Meteorologi, Klimatologi, dan Geofisika (BMKG), and national and local universities on developing substantive content related to agriculture and irrigation technology and good practices and with Kementerian Desa (Ministry of Villages) for dissemination and access to farmers. It will also facilitate coordination and consult with the farmers, women's groups, value chain service providers and buyers. The TA will be administered by ADB through the Indonesia Resident Mission.

b. Institutional, organizational, procurement, and/or financial management assessments on the executing {and implementing} agency previously conducted.

Yes  No

c. ADB inputs

Ten individual consultants (one international and nine nationals) and three firms will be mobilized to support the TA activities. The firms will include: (i) one principal firm or implementing partner to support delivery of all outputs as well as provide coordination support across all activities of the TA; (ii) a second firm will be mobilized that is specialized in agricultural extension content development, and a (iii) third firm will be mobilized for IT applications development and implementation. The total consulting service requirements are an estimated 528 person-months (15 person-months international and 513 person-months national consultants).

All consultants will be engaged by ADB in accordance with ADB's Guidelines on the Use of Consultants (2013, as amended from time to time), and will work on an intermittent basis, unless otherwise required by the TA.<sup>28</sup> All firms will be recruited through a quality- and cost-based selection (QCBS) method with standard quality ratio of 90:10. Outline terms of reference (TOR) for the consulting services are in Appendix 3. The copyright on application developed under the TA and their use will be agreed and stated in contractual agreement in accordance with ADB's policies and guidelines. The proceeds of this TA will be disbursed in line with the Technical Assistance Disbursement Handbook (2010, as amended from time to time). There will be no physical asset provided by the TA.

d. Complementary inputs to be provided by the government and/or other TA providing agencies.

The government will provide counterpart inputs in the form of office space, access to data, resource persons and other in-kind support for effective coordination and implementation of the TA.

15. Nature and/or extent of government and/or beneficiary involvement in identifying or conceptualizing the assistance. Consultations have been undertaken with the following agencies: BAPPENAS; Ministry of Agriculture; officials and extension workers from Provincial and District Agricultural Offices and farmers (male and female) in Kuningan, Majelengka, Bima and Dompu; MPWH, BPPT, IFAD; FAO; Mercy Corps; PISAgro; 8 Villages (mobile applications services), Faculty of Agriculture, Gajah Mada University, JICA and the Embassy of Japan. Consultations and synergy are key process elements in preparation of this TA and will be embedded in the implementation arrangements.

<sup>28</sup> Consulting services under the TA will be engaged on output-based/ lump sum contracts to reduce administrative burden and improve economy, efficiency and value for money.

16. Cost Estimates and Proposed Financing Arrangements

The TA is estimated to cost \$2.2 million equivalent. It is proposed that the ADB will provide \$2 million equivalent to be financed on a grant basis by the Japan Fund for Poverty Reduction.<sup>29</sup> The remaining balance (equivalent to 9% of the total TA amount) will be provided by the Government and TA recipients in in-kind contributions (e.g., office space, counterpart salaries, and time inputs of TA recipients). Table 1 presents the tentative financing plan.<sup>30</sup>

**Table 1: Tentative Financing Plan (\$ millions)**

Source	Amount (\$ million)	Share of Total (%)
ADB – Trust Fund	2.00	100
<b>Total</b>	<b>2.00</b>	<b>100.00</b>

Source: Asian Development Bank estimates.

17. Initial assessment on eligibility of expenditure

Proposed activities are likely to comply with specific fund regulations, agreements and/or guidelines

Waiver from the Board may be necessary for {exceeding the normal limit of the use of pilot testing on the TA approach (use of TASF for items other than the eligible activities defined by TASF regulations).

18. Monitoring and Evaluation

M&E will be carried out in the following ways: First, ADB review missions will be carried out on a regular basis to monitor implementation progress and address any issues that may arise during the implementation of the TA. The consultants will also be required to make quarterly progress reports on TA implementation and highlight any potential issues or delays in implementation. ADB will work closely with the EA to ensure timely and effective implementation of the TA. Second, the high-level Steering Committee chaired by BAPPENAS and including all key government stakeholders will meet on a bi-annual basis to provide TA oversight review TA progress, provide policy guidance, and facilitate interagency coordination and exchange of lessons. Third, bi-annual planning and review meetings will also be undertaken comprising EA, IA, content and mobile applications development agencies, mobile network operator, farmers, value chain service provider stakeholders, concerned CSOs, development partners, and other stakeholders directly collaborating with the TA to develop initial annual work plan, review accomplishments, challenges, and lessons learned before selecting activities for inclusion in subsequent work plans.

19. Estimated period of TA implementation:

- a. Approval of TA: June 2017
- b. Physical completion of TA: July 2020
- c. Closing of TA: October 2020

<sup>29</sup> The TA will be administered by ADB.

<sup>30</sup> Taxes and duties related to expenditures funded by ADB will be financed by ADB.

## CAPACITY DEVELOPMENT TECHNICAL ASSISTANCE AT A GLANCE

1. Basic Data		Project Number: 51158-001	
<b>Project Name</b>	Leveraging ICT for Irrigated Agricultural Information	<b>Department /Division</b>	SERD/IRM
<b>Country</b>	Indonesia	<b>Executing Agency</b>	National Development Planning Agency (BAPPENAS)
2. Sector	Subsector(s)	Financing (\$ million)	
✓ Agriculture, natural resources and rural development	Irrigation		2.00
		<b>Total</b>	<b>2.00</b>
3. Strategic Agenda	Subcomponents	Climate Change Information	
Inclusive economic growth (IEG)	Pillar 2: Access to economic opportunities, including jobs, made more inclusive	Climate Change impact on the Project	Low
4. Drivers of Change	Components	Gender Equity and Mainstreaming	
Partnerships (PAR)	Civil society organizations Implementation Private Sector United Nations organization	Effective gender mainstreaming (EGM)	✓
5. Poverty and SDG Targeting		Location Impact	
Geographic Targeting	Yes	Not Applicable	
Household Targeting	No		
SDG Targeting	Yes		
SDG Goals	SDG2		
<b>6. TA Category:</b>	B		
<b>7. Safeguard Categorization</b>	Not Applicable		
8. Financing			
Modality and Sources		Amount (\$ million)	
<b>ADB</b>		<b>0.00</b>	
None		0.00	
<b>Cofinancing</b>		<b>2.00</b>	
Japan Fund for Poverty Reduction		2.00	
<b>Counterpart</b>		<b>0.00</b>	
None		0.00	
<b>Total</b>		<b>2.00</b>	
9. Effective Development Cooperation			
Use of country procurement systems		Yes	
Use of country public financial management systems		Yes	

## DESIGN AND MONITORING FRAMEWORK

<b>Impact(s) the TA is Aligned with</b> rural incomes, food security and livelihoods improved (2015-2019 National Medium Term Development Plan and 2005-2025 long-term National Development Plan)			
<b>Results Chain</b>	<b>Performance Indicators with Targets and Baselines</b>	<b>Data Sources and Reporting</b>	<b>Risks</b>
<b>Outcome</b> Management of agricultural extension information services in three districts in rural Indonesia improved	By March 2020 a. 70% of extension workers in the TA districts have increased access to and knowledge of cutting-edge farm management practices ICT/ mobile services (40% female) (2016 baseline: 0) b. 70% of farmers in the TA districts report satisfaction with ICT/ mobile extension services (40% female) (2016 baseline: 0)	a, b. TA monitoring/ completion reports and interviews with extension workers, farmers and value chain service providers beneficiaries	Inadequate coordination with government counterparts and key stakeholders for the delivery of TA activities and outputs.
<b>Outputs</b> <b>1. Model and strategy developed for using ICT for agricultural information exchange</b>  <b>2. Context specific, low cost, timely and actionable extension information provided</b>	By April 2018 1a. ICT/mobile application model covering technology, institutional, financial, economic and gender aspects – developed and endorsed by government and functioning (2016 baseline: 0)  By Dec 2019 2a. Context specific and updated extension information disseminated at least weekly to farmers, extension workers and other stakeholders. (2016 baseline: 0) 2b. 70% of farmers in TA areas reached with ICT/Mobile extension services (40% female) (2016 baseline: 0) 2c. Functioning Value chain stakeholders' mobile platform established. (2016 baseline: 0)	1a. Report on strategy and model development.  2a, 2b, 2c. Interviews with farmers and various stakeholders and TA monitoring reports	Adequate assessments of and corresponding plans for financial feasibility and commercial viability of the various activities are not undertaken.  Lack of commitment and engagement of the various government and private sector stakeholders to activities
<b>3. M&amp;E and use of information for policy advocacy for irrigated agriculture</b>	3a. TA management, implementation, and consulting teams fully	3a& 3b. Quarterly and annual TA monitoring reports	

Results Chain	Performance Indicators with Targets and Baselines	Data Sources and Reporting	Risks
<b>and TA effectively managed</b>	staffed (30% women) (2016 baseline: 0) 3b. Sex-disaggregated data TA performance and management systems established (2016 baseline: 0)		
<b>Key Activities with Milestones</b>			
<b>Model and strategy developed for using ICT for agricultural information exchange</b>			
<p>1. Recruit international consultant and national firms, Q3, 2017</p> <p>1.1. Undertake desk review past and ongoing initiatives on use of ICTs in agriculture, Q4, 2017</p> <p>1.2. Conduct consultations with farmers, including women, relevant agencies (including, input suppliers, financiers and buyers) and private providers, Q4, 2017</p> <p>1.3. Undertake field visits to identify farmers' needs, issues, constraints in access to information, Q4, 2017</p> <p>1.4. Identify appropriate ICTs to deliver extension information services and assess technological, financial and social sustainability, Q4, 2017</p> <p>1.5. Develop a framework for public private partnerships in the delivery of ICT services, Q4, 2017.</p> <p>1.6. Identify TA locations, beneficiaries, crops and strategic value chains to be supported, Q4, 2017</p> <p>1.7. Prepare final report on Strategy for ICT/ mobile extension services, Q1, 2018</p> <p>1.8. Ensure gender issues are mainstreamed in all consultations, needs assessments, strategy and service development, Q4, 2017 and Q1, 2018</p>			
<b>Context specific, low cost, timely and actionable extension information provided</b>			
<p>2. Based on above, develop a time bound detailed implementation, detailed work plans and output list of all TA staff and consultants and implementation arrangements with relevant government and private sector agency endorsements on activities, timeline and collaboration, Q1, 2018</p> <p>2.1. Develop module/ content and database for extension information, Q2, 2018</p> <p>2.2. Develop mobile/ ICT (web-based) applications (for daily tips, expert guidance) and various stakeholder (farmers groups, including women farmers, value chain groups, market links, etc.) platforms for delivery of information, Q2, 2018</p> <p>2.3. Develop standard operating procedures for the various content/ applications, Q2, 2018</p> <p>2.4. Develop short training for field support staff, core group of extension workers and farmers for use of mobile applications, Q2/3, 2018</p> <p>2.5. Implement model/strategy, Q3, 2018</p>			
<b>M&amp;E and use of information for policy advocacy for irrigated agriculture and TA effectively managed</b>			
<p>3. Identify/ Recruit and train EA and IA by Q3/4 2017</p> <p>3.1. Establish sex disaggregated TA performance management system by Q4 2017</p> <p>3.2. Recruit consulting services and specialists by Q3 2017</p> <p>3.3. Gender training for TA management unit, TA implementation unit, consultants, and implementation team by Q2 2018</p> <p>3.4. Biannual planning and review steering committee meetings 2017, 2018, 2019, 2020</p> <p>3.5. Exit strategy developed and implemented by Q3 2018 until Q2 2020</p> <p>3.6. Midterm evaluation ( by 2018) and completion report by Q2 2020</p>			
<b>Inputs:</b> ADB: \$2,000,000 grants JFPR. Government will provide 9% of the total TA amount in in-kind contributions (e.g., office space, counterpart salaries, and time inputs of TA recipients).			
<b>Assumptions for Partner Financing. Not Applicable</b>			

EA = executing agency; IA = implementing agency; ICT = information and communication technology; JFPR = Japan Fund for Poverty Reduction; M & E = monitoring and evaluation.

Source: Asian Development Bank

## OUTLINE TERMS OF REFERENCE FOR CONSULTING SERVICES

1. Ten individual consultants (one international: 15 person-months and nine national: 181 person-months), and three national firms (with consultants totaling 332 person-months) will be mobilized to support the TA activities. The firms will be specialized in agricultural extension content development, mobile applications development and management of overall ICT and agriculture TA.
2. The individual consultant will be engaged on an intermittent basis using the individual consultant selection (ICS) method in accordance with ADB's *Guidelines on the Use of Consultants* (2013 as amended from time to time). The firm will be recruited using the quality-and cost-based selection (QCBS) method with standard quality ratio of 90:10 and shall conform to ADB procedures. Both individual consultant and firm will possess adequate qualifications, expertise and experience to perform the services.
3. Outline terms of reference (TOR) for the consulting services is provided below. The proceeds of this TA will be disbursed in line with the Technical Assistance Disbursement Handbook (2010, as amended from time to time).
4. Training, consultations, workshops will be organized by ADB or by the consultants in accordance with ADB's *Procurement Guidelines* (2015, as amended from time to time) or ADB's *Guidelines on the Use of Consultants*, (2013, as amended from time to time) as appropriate. The team will coordinate closely with BAPPENAS, Ministry of Agriculture, and other key stakeholders.

### A. Individual Consultants

#### (1) International ICT and Agriculture Expert Team Leader (International, 15 person-months)

5. The expert will work closely with BAPPENAS and MOA and will assume primary responsibility for overseeing implementation of the entire TA including management and coordination of overall assessments, strategy development, input into output design, development of implementation plan for the TA, development of work plans for all consultants and supervision of all consultants' delivery of activities and outputs and monitoring. In undertaking the assigned TA management tasks, the ITL will coordinate with appropriate EA/ IA and work closely with the both the principal and second firms and will be supported by the National Team Leader (NTL). Specific tasks include: (i) undertaking the assessments of ICT initiatives in agricultural extension in Indonesia (this will also provide a baseline for the pilot); (ii) developing the overall strategy and model with inputs from the consulting team and all key stakeholders; (iii) overseeing and providing inputs into all substantive content development; mobile/ICT applications development; all PPP agreements and implementation MOUs signed with government and other key stakeholders; training material development; field supervision; mid-term and end TA reviews; and (iv) overseeing and ensuring gender analysis and mainstreaming in all activities.
6. **Preferred Qualifications and Experience:** The expert should have at least 10 years professional experience in ICT and agricultural extension services, in particular, developing and managing mobile based agricultural extension services in emerging economies. S/he should have at least a master's degree in agriculture or related field. S/he should have knowledge of gender issues in agriculture. An understanding of the government processes, social and cultural

environment in Indonesia would be an advantage. Knowledge of ADB and/or ODA TA administration procedures and experience of implementing TAs financed by the Japan Fund for Poverty Reduction would be an asset. The ITL should have understanding and skills related to gender and development issues.

7. The team leader will report to EA/IA and the ADB TA officer. Assignment will be in Jakarta on an intermittent basis over a 48 month period from mid-2017 to mid-2019.

**(2) National Agriculture Expert/ Adviser (National, 12 person-months)**

8. The expert will work closely with BAPPENAS, MOA, the International Team Leader and the National Team Leader to develop the overall strategy and model. Other key assignments include: S/he will (i) identify agencies to undertake the content development packages; (ii) provide oversight of all content development for the TA; (iii) identify, engage and maintain networks with international, national and local knowledge providers; (iv) analyze TA M&E data and provide recommendations for policy reform, e.g., subsidies, delivery mechanism, etc.; (v) support the conceptualization of a sustainable exit strategy (vi) liaise and coordinate with government and key academic/ research stakeholders; and (vii) ensure gender analysis and mainstreaming in all activities.

9. **Preferred Qualifications and Experience:** The expert should have at least 10 years professional experience in agricultural sector, in particular, developing and managing agricultural/ irrigation extension content. She/he should have at least a master's or PhD degree in agriculture. Knowledge of cutting edge agricultural/ irrigation technology, agriculture and irrigation extension history and developments, government processes, social and cultural environment in Indonesia is required.

**(3) Team of 4 Experts and 3 Research/Data Collection and Administrative consultants to undertake independent M&E/ thematic studies and recommendations for policy advocacy in the sector (National: 48 person-months for 3 experts and 99 person-months for Junior consultants. Total 147 person-months)**

10. The 4 experts will be responsible for overall preparation and management of and high-level consultations on thematic studies related to strengthening implementation and informing evidence based policy advocacy on irrigation and agriculture pertinent to the whole sector – in support of the IPDMIP Knowledge Management Centre financed by IFAD. The three junior level consultants will be responsible for desk research, data gathering, logistics management support, etc.

11. **Preferred Qualifications and Experience:** For Experts: Master's degree in economics with exposure to water resources and agriculture development. He/she should have sufficient experience in the irrigation development and water resources development at least 7 years and familiar with rural economic potential. He/she should have experience in assisting the local and central government in planning and monitoring and policy advocacy.

For Administrative Consultants: University degree in water resources and agriculture development. Ability to research, gather data, undertake initial analysis. He/she should possess good organizational skills. All consultants should be able to speak and write English well.

**(4) M&E Specialist (National, 22 person-months)**

12. The consultant will (i) set up the TA sex disaggregated M&E database and develop M&E templates; (ii) record of all activities and result by farmer, crop and location; (iii) maintain a database of farmer profiles; and (iv) provide inputs into all planning and review meetings and activities as well as bi-annual and annual monitoring reports.

13. **Preferred Qualifications and Experience:** Degree in a relevant field of Monitoring System with professional related experiences in PPMS at least 5 years.

**B. Consulting Firms**

**14. General Requirements for the Consulting Firms**

Eligible to provide consulting services to ADB and/or ODA funded TAs.

- (i) Have legal status (public or private), operating under Enterprise Law.
- (ii) Have business registration or decision to specify appropriate business fields according to the required contents of the consultancy package.
- (iii) At least five (5) years working experience in related areas.
- (iv) Have performed at least three (3) similar Contracts during the last three (3) years; of which at least one similar contract relating to ICT in agricultural extension.
- (v) Have essential financial capacity.
- (vi) The consultants provided under the firm will work under the direction of ITL and report directly to her/him. National consultant work programs will be developed in consultation with and will require the approval of the ITL.

**C. Consulting Firm for Substantive Content Development**

15. One firm will be mobilized that is specialized in agricultural extension content development.

**(5) Team of three experts and three research consultants on Content Development (National, 40 person-months for Experts and 60 person-months for research consultants; total 100 person-months)**

16. The experts will be responsible for overall content development. Specific activities include, (i) reviewing content in current initiatives; (ii) identifying crops and strategic value chains which have high potential for improved production, increased profitability and higher income for smallholders; (iii) development of all content/modules for agricultural technology and cutting edge farm management practices for crops selected, ensuring gender issues are integrated in all content developed; (iv) providing expert advice to support the farmers' Q&A/expert interface with farmers/ helpline; and (v) providing initial training to field facilitators, key pool extension worker trainers, key pool of national and provincial Cyber Extension staff, key pool of farmer peer trainers.

17. The research consultants will be responsible for (i) data gathering and initial analysis; (ii) arranging consultation with key stakeholder; (iii) supporting experts in preparing the content modules; (iv) maintaining and monitoring the farmers' helpline; and field monitoring support.

18. **Preferred Qualifications and Experience:** For Experts: PhD or Master's Degree in environment, agriculture and natural resources, with experience in developing and managing training content on agricultural extension services. At least 10 -15 years of in-country experience in Indonesia.

19. For research consultants: Degree in environment, agriculture and natural resources, with experience in developing and managing training content on agricultural extension services. At least 5 years of in-country experience in Indonesia.

#### **D. Consulting Firm for Application Development and Maintenance**

##### **(6) Team of three experts and three assistant operators on Mobile Application Development and Maintenance (National, 60 person-months for Experts and 60 person-months for assistant operator consultant; total 120 person-months)**

20. The experts together with assistant operators will be responsible for overall mobile application development and maintenance. Specific activities among others, include, (i) developing mobile applications to register and profile, farmers and other participants; (ii) develops the various platforms, including : farmers' Q&A/ helpline interface; farmers' peer group; value chain platform linking farmers, irrigation authorities, input providers, processing facilities, traders, entrepreneurs; linkages with markets and market information (through Ministry of trade and other private sector sites/ links); (iii) agreements related to ADB copyright of applications/ platforms developed and (iv) providing training and field monitoring support, etc.

21. **Preferred Qualifications and Experience:** Degree in ICT, in particular, for Experts: at least 5 -7 years and for assistant operators at least 3 years of practical experience in developing IT / mobile applications for agriculture sector/ extension services.

#### **E. Principal Coordinating Firm**

22. A third firm will be mobilized to manage the day to day operations of the TA.

Overall Scope of Services for the Principal Firm/Implementing Partner includes:

- overall responsibility for undertaking assessment strategy/model development
- supervising the content development
- supervising the mobile application development and maintenance
  - o specific activities include
  - o developing/ adapting mobile applications to register and profile, farmers, value chain service providers and other participants
  - o developing various platforms:
    - farmers' Q&A/ helpline interface
    - farmers' peer group
    - daily tips platform
    - contact details of local value chain service providers/ input suppliers (information to be drawn from IFAD)
    - value chain platform linking farmers, irrigation authorities, input providers, processing facilities, traders, entrepreneurs (information to be drawn from IFAD)
    - platforms linking farmers with buyers or markets and market information (through Ministry of Trade and other private sector sites/ links)
- overseeing relationship with mobile network operators
- development of sex disaggregated M&E database and maintenance

- adapting and providing financial literacy and linkage with MFIs and credit access through IFAD initiatives
- supervision/management of all training and capacity development activities, including training of trainers of trainers; training modules; etcetera
- field facilitation, and monitoring all activities, including content training and applications use
- ensuring that gender analysis and mainstreaming are adequately undertaken in all activities
- monitoring and recording of all activities, including profiles of farmers supported by the TA
- undertaking bi-annual planning and review meetings with all TA stakeholders
- providing support to relevant ministries in developing and implementing an agreement with mobile network operator (MNO) for providing a financially affordable mobile/ internet package for farmers and extension workers
- facilitating agreements with private sector IT applications agencies related to copyright of applications/ platforms developed
- coordination with all relevant government agencies, at national, provincial, district and village levels, in particular the Ministry of Agriculture in implementing all activities
- coordinating with MOA on synchronizing data/content and update of Cyber Extension
- coordinating with all relevant TA stakeholders during regular implementation as well as part of bi-annual planning and review meetings. preparing bi-annual work plan and monitoring reports to ADB and TA EA and IA on TA activities and results as well as preparing annual reports and the final TA completion report

23. An indicative list of team members in the implementing partner are listed below. These positions are identified as required positions to deliver the services. Except for these 8 experts, the proposing firms may determine the number and nature of any additional team members required to deliver the TA objectives and outputs.

**Table 1: Required Team Members for Implementing Partner**

Expertise	Person- Months
Team Leader – Agriculture Extension Services Management Specialist	32
Field Officers -training and monitoring (6 persons: 2 per district)	80

Source: Asian Development Bank

**(7) Agriculture Extension Services Management Specialist, Team Leader (National, 32 person-months)**

24. The National Team Leader (NTL) will be based in Jakarta and stationed at the IA office. The NTL will assist the ITL to manage and implement the TA, including overall supervision of all the consultants. The NTL will support the EA/IA implement, coordinate and provide day-to-day substantive inputs in the implementation of activities. Specific tasks include: (i) development and supervision of the substantive content or module for ICT/ mobile based agricultural extension services; (ii) supervision of mobile applications development; (iii) monitoring of all activities; trainings; mobile expert interface/helpline; and (iv) all platforms: farmers' groups; value chain groups; market linkages/ platform; etc. In addition, The NTL will assist team leader in monitoring TA implementation and prepare TA progress reports for submission to the TA director for review and finalization before onward submission to ADB and the government.

25. **Preferred Qualifications and Experience:** Degree in environment, agriculture and natural resources, with experience in developing and managing training content on agricultural extension services. At least 8 years of in-country experience in Indonesia.

**(8) Team of six Field Officers (2 per district) - training and monitoring (National, 80 persons-months)**

26. The consultants will be based in the TA locations, support implementation and undertake monitoring of all activities. All activities will be recorded and reports submitted bi-monthly to the M&E specialist. The consultants will also provide training to relevant stakeholders, on content, applications as well as on financial literacy. They will organize workshops and meeting to support various activities, including interface between farmers and local MFIs and credit providers.

27. **Preferred Qualifications and Experience:** Degree in social sciences or community based development activities with relevant field experience of at least 3 years in implementation and monitoring.

**F. Terms of the Assignment**

28. Experts will be based primarily in Jakarta and TAs districts for the duration of the assignment. The duration of the assignment is three years from the start date, expected to be around the first week of June 2017.

29. The firms will report to the ADB Team Leader / TA Officer for the TA and designated officials from the Government of Indonesia.