

**Program Concept Note for the Use of Resources from the PPCR Competitive Set-Aside  
(Round II)**

<b>1. Country/Region:</b>	Cambodia	<b>2. CIF Project ID#:</b>	
<b>3. Project/Program Title:</b>	<i>Cambodia: Integrated Climate Resilient Rice Value Chain Community project</i>		
<b>4. Date of Endorsement of the Investment Plan:</b>	Endorsement of SPCR	29 June 2011	
	Endorsement of revised SPCR	11 February 2014	
<b>5. Funding Request (in million USD equivalent):</b>	<i>Concessional Loan: USD 5.00 million</i>		
<b>6. Implementing MDB(s):</b>	ADB	<input checked="" type="checkbox"/> Private sector arm	<input type="checkbox"/> Public sector arm
<b>7. Executing Agency:</b>	ADB Private Sector Operations Division (PSOD)		
<b>8. MDB Focal Point and Project/Program Task Team Leader (TTL):</b>	<i>Headquarters- Focal Point: Mrs. Cinzia Losenno Senior Environment Climate Change Specialist (Climate Change Adaptation) PPCR Focal Point closenno@adb.org</i>  <i>Mr. Don Purka Principal Investment Specialist CIF Private Sector Focal dpurka@adb.org</i>	<i>TTL: Mr. Shuji Hashizume Investment Specialist Private Sector Operations Dept shashizume@adb.org</i>  <i>Mr. Martin Lemoine Senior Investment Specialist Private Sector Operations Dept mlemoine@adb.org</i>	

**I. Project/Program Description**

1. This project aims to reduce the climate vulnerability of at least 50,000 smallholder farmers in the Battambang and Pursat provinces of Cambodia by increasing rice production and value, and improving access to extension services and affordable loans. The project covers all aspects of the rice value chain, from production to post-harvest and marketing, thus providing seamless support to the rice value chain whilst addressing climate risks, reducing wastage, increasing agricultural productivity and creating an efficient and sustainable financial system. It contributes to the objectives of Cambodia's Rice Policy<sup>1</sup>, builds on ADB's programs (Climate Resilient Rice Commercialization Sector Development Program, Poverty Reduction and Smallholder Development Project, Water Resource Management Sector Development Program and the Flood Damage Emergency Reconstruction Project), and is aligned with the Cambodia's Strategic

<sup>1</sup> Council of Ministers. 2010. *Policy Paper on the Promotion of Paddy Production and Rice Export*. Phnom Penh.

Program for Climate Resilience, the Cambodia Climate Change Strategic Plan 2014-23 (CCCSP)<sup>2</sup> and the National Adaptation Program of Action to Climate Change (NAPA).<sup>3</sup>

2. The project will (i) augment paddy drying equipment to improve quality and reduce wastages, (ii) provide microcredit to smallholder farmers to enable them to procure agricultural inputs and related extension services, (iii) increase the number of farming members of the integrated paddy farming communities (Baitang - Green community) to 50,000 households, and (iv) construct climate-proofed warehousing and storage facilities for farmers, millers and traders to store paddy and refine rice. The project will also establish a biomass facility with non-PPCR funds, using rice husk to produce renewable energy, so as to reduce reliance on expensive conventional energy from the grid and make rice pricing more competitive in both domestic and international markets. The project will:

- Facilitate cross sector improvements in three priority areas – water, agriculture and natural resources, and rural infrastructure development;
- Focus on-the-ground investment and promote smallholders inclusion;
- Protecting businesses and livelihoods from the negative effects of climate variability and change by introducing innovative climate resilient infrastructure features in post-harvest facilities, enhancing productivity, reducing wastages and increasing income levels;
- Build climate resilience of smallholders and farming communities by providing financial resource to introduce climate resilient technologies and strengthen production skills to effectively overcome climate change impacts;
- Improve food, water and energy security;
- Facilitate collection of produce both at farm gate and at centralized locations to eliminate middlemen and exploitative traders;
- Promote private sector participation in climate risk management.

3. The PPCR private sector set aside funding will be used for a loan to Baitang (Kampuchea)<sup>4</sup>, a Cambodian private limited company (plc), for (i) capital expenditure for climate-proofed warehousing and storage facilities (\$1 million); and (ii) on-lending to local farmers to procure agricultural inputs, small farm equipment and related extension services (\$4 million). Baitang is an established rice processing company that has established a green community of farmers. Baitang extends short-term microfinance and related agricultural extension support. It procures paddy from its community members at competitive market prices, produces quality refined rice for domestic and export markets and provides storage facilities for both farmers and traders.

4. The company intends to increase its existing membership from 6,000 smallholder farmers to 50,000 members in the Battambang and Pursat provinces by extending additional credit finance for the communities thus expanding its paddy collection footprint. This will necessitate enhancing its rice processing and logistics infrastructure. It will also augment and modernize its existing facilities to counter the challenges of international competitive pricing, improving quality and climate resilience, and create a large inclusive smallholder community network that will be more resilient and better adapted to the impacts of climate change to food and livelihood security issues.

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<sup>2</sup> National Climate Change Committee. 2013. *Cambodia Climate Change Strategic Plan 2014-23*. Phnom Penh.

<sup>3</sup> Ministry of Environment. 20016. *National Adaptation Program of Action to Climate Change*. Phnom Penh.

<sup>4</sup> Company website: <http://www.baitangplcrice.com/>

5. The project is being developed with the project sponsor. The project sponsor, Baitang, is ready for implementation and is suitably positioned to deploy the additional resources. Following PPCR Sub-Committee's approval, ADB expects to approach its management for due diligence in the third quarter of 2014, and seek board approval in first quarter of 2015.

## II. Context and market

6. Cambodia has a high vulnerability to the impacts of climate change due to its economic dependence on agriculture and the low adaptive capacity of its population and institutions. The agriculture sector contributes more than one third to Cambodia's GDP and is a source of livelihood and income for over 80% of the population. Rice accounts for 80% of all cultivated land and is the staple diet as it provides 75% of the daily energy intake for the average Cambodian. It is the dominant crop as 80% of all farmers grow rice for sustenance however only 40% are able to produce a marketable surplus primarily on account of low yield ratios (2.9 tons/ha)<sup>5</sup> and small farm holdings. Rice cultivation is mainly dependent upon rainfall and the wet season contributes to over 85% of the total rice production. The country has an 'economic scarcity' of water: although water is abundant in most areas (especially during the wet season May to October), rural communities are often unable to utilize the available supply because of inadequate infrastructure.<sup>6</sup> Exacerbated by climate change, unsustainable land and water management practices including deforestation have led to reduced soil fertility and lower water and crop productivity. This has adversely affected marginal farmers (mostly 0.7-1.5 ha) who remain at the subsistence farming level and have serious food security issues in times of droughts and floods resulting in low yields. Projections indicate that precipitation will be concentrated during the wet season, dry season rainfall will decrease and extreme weather conditions will be more frequent. These climate-related extremes will adversely affect agriculture and reduce the productivity of the land available for cultivation.

7. The NAPA was drafted with the strategic objective to address the issues relating to land degradation, water security and climate proofing of infrastructure to adapt to climate change. The Royal Government of Cambodia (RGC) has also set out a Rice Policy for the promotion of paddy production and export of milled rice through production enhancement, diversification and agriculture commercialization. In addition to enabling policy initiatives it envisages that private and public investments will create a conducive environment to meet climate change challenges by developing climate resilient adaptation initiatives that sustain agricultural production and yield.

8. Capital inadequacy all along the rice value chain is a major impediment to both rice production and post-harvest activities. Majority of rice growers are smallholder subsistence farmers who depend on marginal yields from their land for their livelihood and survival. They do not have resources to procure quality seeds and agricultural inputs such as fertilizers and chemicals or pay for water in the dry season. Given limited access to credit facilities, traders find it difficult to purchase adequate quantities of paddy because of a paucity of funds. The lack of storage facilities and the high cost of transportation add to the cost of procurement. The cost of operations and low margins makes it difficult for millers to generate enough revenue to modernize their existing

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<sup>5</sup> Thailand: 2.8 t/ha; Laos: 3.5 t/ha; Vietnam : 4.9 t/ha. Source: Policy Paper on the Promotion of Paddy Production and Rice Export.

<sup>6</sup> Decentralized Governance of Irrigation Water in Cambodia: Matching Principles to Local Realities; CDRI

equipment or carry out periodic operation and maintenance activities. The high cost of energy, lack of warehousing infrastructure and the use of old and outdated equipment resulting in a higher percentage of broken rice further reduce profit margins and add to the cost of milled rice.

9. Provision of credit from commercial banks and other financial institutions to farmers, traders and millers are limited because of a lack of collateral security and other guarantees. Lending for farmers using land as collateral seldom exceeds 30%-50% of the assessed land value. Often the absence of land titles and adequate documentation makes it difficult to secure loans. Commercial lending institutions are reluctant to lend money against agricultural produce (paddy) unless they have control over the stock and are stored in a secured warehouse. Millers have limited borrowing opportunities as old equipment is rarely accepted as collateral, and collateral on new equipment for enhancement or extension services (70% maximum) is insufficient to buy the machinery, as millers do not have enough personal funds to pay the balance cost as well as provide working capital for operations. Financing institutions have not been constrained by a lack of funds for providing credit but by the lack of guarantee support, unsatisfactory accounting and book keeping practices of borrowers, and the associated difficulties in securing credit securities and monitoring collection. This makes it both impossible and unviable for farmers, small-scale millers and traders to obtain short term credit to expand and upgrade their activities, facilities and services. Farmers are left to seek finance from informal channels – friends, relatives and moneylenders – at varying interest rates (12% - 24% p.a.) all of which directly impacts the cost of production. The fragmentation within the sector in terms of small land holdings, number of small traders and varieties of paddy cultivated also compound the problem of consolidation and collection of produce leading to increased cost of securing an economic quantity for milling and subsequent sale.

10. The post-harvest value chain for rice production involves the intervention of three different players each with individual objectives to secure the best possible price. Farmers are anxious to offload the crop at the earliest opportunity and secure a good value for the paddy harvest, the trader seeks to procure paddy at the lowest possible price and the miller aims to obtain good quality paddy for milling to maximize value addition. Perpetual indebtedness, inadequate storage facilities and lack of market knowledge has eroded the incomes of most farmers forcing them to be price takers by accepting whatever value is offered at harvest time. The trader is constrained by the lack of credit facilities and the cost of transportation that constantly shrinks margins. The miller is limited by the high cost of energy and finance that makes it unviable to modernize and expand existing equipment to ensure good quality and reliable output.

11. Post-harvest activities cover the entire range of actions from harvest to consumption including harvesting techniques, threshing, drying and de-husking processes, storage, milling, grading and transportation of rice. Although no reliable figures are available for the country, it is estimated that post-harvest losses in the rice sector are closer to 20% of the paddy harvest. The lack of adequate storage facilities on farm and at homesteads results in the largest quantum of grain loss (6%-7%). Milling losses on account of inefficient and poorly operated and maintained equipment is in the range of 4% - 4.5%. The lack of an integrated and organized post harvesting facility at the commune or township level is the single largest contributor to low net yields of processed rice (42%). Post-harvest losses to insects, pests, inefficient equipment, exposure to adverse weather conditions, insufficient drying, poor storage and inadequate transportation facilities all add to grain loss thus severely impacting farmer incomes. In sum, post-harvest losses, high cost of

transportation<sup>7</sup> and energy<sup>8</sup> and the limited availability of finance all along the rice value chain make rice pricing uncompetitive in comparison to produce from Vietnam and Thailand,<sup>9</sup> even though cost of procurement at the farm gate is lower.<sup>10</sup>

12. PPCR resources from the competitive private sector set aside is required to address a substantial proportion of the constraints and risks stated above and develop a pilot project with a sustainable financing mechanism that will meet the critical requirements of the farming communities. The project will mainstream climate resilient measures in the production and post-harvest stages to reduce farming communities vulnerabilities to climate change. These will be supplemented with technical advice and agricultural extension measures. The project will enable competitive pricing of the produce and will improve livelihoods in the target farming communities.

### **III. Project description and Innovation:**

#### **a. Project Description**

13. The project has three distinct and integrated components: and the third:

- Credit line to small farm holders; and
- Infrastructure – paddy drying equipment and climate proofed warehousing
- Renewable energy - biomass plant

14. The credit line and the infrastructure components are being proposed for PPCR concessional funding. The biomass plant will be processed by ADB's Private Sector Operations Department as commercial funding.

#### ***Credit line***

15. It is proposed that \$4 million of PPCR concessional finance be made available to Baitang for on-lending to small and marginal farmers to implement modern cultivation practices and purchase agricultural inputs such as quality seed, fertilizer and pesticide, install drip irrigation systems, undertake land leveling, and purchase or lease small farm equipment. The availability of good quality seed is one of the biggest constraints in the production of high yield and greater marketable value paddy. It is the initial critical input in the rice value chain and all subsequent activities and inputs are dependent upon farmers being able to access adequate quantity of pure seed at a sustainable price. Currently quality graded seed is essentially supplied by Cambodian Agricultural Research Institute (CARDI)<sup>11</sup> and Agriculture Quality Improvement Project (AQIP) Seed Company (ASC)<sup>12</sup>, both of which do not have the capacity to meet the demand. Together they

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<sup>7</sup> Road Transportation in Cambodia \$15 p/t for 100 km; Thailand \$4 p/t and Vietnam \$7.5 p/t. Container shipment cost in Cambodia \$ 35 p/t; Thailand \$17 p/t and Vietnam \$16p/t.

<sup>8</sup> Energy cost in Cambodia may vary from \$0.30-0.90 p/kwh as compared to Vietnam \$0.10.

<sup>9</sup> Market price of Cambodian White Rice is \$650 p/t as compared to Thailand \$493 p/t and Vietnam \$461 p/t

<sup>10</sup> Farm Gate prices: Cambodia \$250-\$350 p/t; Thailand \$340-350 p/t and Vietnam \$340-\$350 p/t

<sup>11</sup> CARDI is a semi-autonomous government entity under MAFF that is solely responsible for the introduction, breeding, and releasing new rice varieties.

<sup>12</sup> It is a public private sector partnership (MAFF 49%), seed company producing and selling commercial rice seed in Cambodia. ASC evolved from the AusAID sponsored AQIP.

account for less than 4% of the requirement for the total paddy cultivable area. As a result, farmers intending to produce paddy in marketable quantities are dependent on seed supplied to them by Vietnamese or Thai traders. A substantial proportion of the rice cultivation was from farmer-retained seed that had been saved from the previous season's crop. As the seed was seldom graded, cleaned, treated or appropriately stored it did not possess a high germination rate and contributed to successively lower yields. Baitang bulk purchases quality paddy seed of marketable varieties to supply to its community members thus lowering the cost of the seed by about 7% and ensuring that farmers receive quality seed and other agricultural inputs that ensure higher yield.

16. Land leveling is a critical factor to improve water usage and has been a major reason for poor water retention, increased run off and low crop productivity. Cambodian paddy fields are often uneven due to poor ploughing techniques, and as a result, water depths are variable, drainage is impeded, weeding is difficult and the paddy crop is sensitive to drought. Land leveling together with the use of recommended fertilizer showed an average yield increase of 33% depending upon soil quality, leveling without fertilizer inputs increased yields by 15%, and fertilizer inputs without land leveling led to a yield increase of 17.5%.<sup>13</sup>

17. The provision of short-term loans to farmers will allow them to purchase much required inputs and produce quality paddy of a uniform variety that has a good marketable value. The use of a common variety will allow Baitang community members to consider the use of mechanized harvesting equipment thus reducing harvest time, costs and effort. The provision of small loans to a larger number of farmers will enable Baitang to establish a reliable and robust green community that will provide consistent quality and quantity of paddy for processing, increasing income from paddy yields. Baitang will supplement the provision of credit with technical advice and agricultural extension services to facilitate the up-take of climate resilient measures, including new technologies, high value seeds, on-site storage facilities and water resources management. Baitang would extend technical knowledge and skills to its Green community members to improve production techniques, soil fertility, enhance water use efficiency and crop intensification to achieve more 'crop per drop' thus lowering production costs and reducing utilization of water especially during the dry season.

18. Baitang's credit department, using its existing field and head office teams, will administer the small loans and the company will guarantee the funding and repayment.<sup>14</sup> The \$4 million credit line will substantially increase the existing resources (\$2.9 million) available to Baitang for small loans and the concessional element will reduce its cost of capital and allow it to lower interest rates for credit from 12% - 15% p.a. to 8% - 10% p.a. The loans are intended as short term credit that will be provided for a one year tenor to reduce farmer indebtedness, increase investment in modern farm equipment and utilization of agricultural inputs. Credit extensions or longer tenor of up to 3 years could be considered for the purchase of farming equipment, infrastructure (climate proof small storage facilities or silos), and drip irrigation systems that directly impact yield, reduce climate risk and build resilience and enhance adaptive capacity.

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<sup>13</sup> Ministry of Water Resources and Metrology

<sup>14</sup> Baitang intends to apply for a micro finance license but would require to establish a track record. As per Article 12 of Prakas No. B7-00-06 on The Licensing of Microfinance Institutions, previous operating history to establish necessary credentials would be advantageous.

### ***Infrastructure: Drying Plant***

19. It is proposed that ADB through its Private Sector Operations Department (PSOD) will provide a loan of US\$2 million on commercial terms to Baitang to purchase one complete process drying machine in response to the additional demand for drying facilities from farmlands in the two provinces. Baitang will finance 50% of the cost (\$4 million for a 1000 tons paddy per day plant), either from its own resources or as a commercial asset backed loan. It is anticipated that revenues from the drying plant will be adequate to sustain the commercial loan repayment schedule. Baitang operates a successful paddy collection and purchase program and is able to secure adequate quantities of produce for its processing requirements. Given its installed milling and refining capacity and the market demand from both domestic and international traders, it can substantially increase its procurement from the coverage areas thus servicing a larger number of its community members as also other smallholder farmers. Baitang is constrained in procuring additional quantities of paddy by the limitation of its installed drying plant. Drying is the most critical stage in the post harvesting cycle since quality begins to deteriorate immediately after harvest and the process has to be completed within a short period, usually between 24 hours and one week. The harvesting period is spread over a 2-3 weeks during which farmers are anxious to thresh and dry the paddy so that it can be sold. Drying capacities are therefore required to exceed other processing volumes, as the entire crop has to be uniformly dried to retain the specified humidity levels (14%) for further storage. Delayed or inadequate drying results in microbial growth and odor, and also leads to stack burning, powdery residues, and broken or shattered rice during the rice milling process. It is estimated that losses due to bad drying practices range from 1%-5% and that as much as 30%-50% of the potential earnings are lost between harvest and market.<sup>15</sup> Traditional sun drying methods leads to contamination, impurities, lower germination rate, discoloration, unpleasant odors and exposure to adverse weather. The lack of adequate drying facilities and financial resources force farmers to sell wet paddy at low prices to collectors and traders within 24 hours of harvest much of which ends up in Thailand and Vietnam. Mechanical drying processes are now considered the industry standard for uniform and regulated drying to retain the correct amount of humidity.

### ***Infrastructure: Warehousing***

20. It is proposed that PPCR concessional loan amounting to \$1 million be made available to Baitang to finance the additional costs of climate proofing warehousing facility. The concessional financing will assist in covering the higher initial investment costs associated in developing climate-proofed infrastructure<sup>16</sup> and reduce the reliance on more expensive commercial borrowings that would impact the viability of the facility. Baitang will augment its existing storage infrastructure and build 2 new climate-proofed warehousing facilities with a total capacity to stock 300,000 tons of paddy and rice. The cost of a conventional 100,000 ton warehouse is estimated to be \$1 million. The construction of a climate-proofed and pest resistant warehouse, that will securely stock the agricultural produce, fertilizers and pesticides and other inputs, involves an incremental cost of \$400,000. Baitang will use its own funds, either internally generated, retained

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<sup>15</sup> International Rice Research Institute

<sup>16</sup> Warehousing facilities will be designed to reduce the negative impacts of heat stress and floods. Climate proofing solutions could include roof insulation and air circulation mechanisms to prevent build-up of excessive heat and humidity, construction of warehousing on raised foundations with adequate provision for drainage, and hermetic and airtight solutions especially for storing of seed. In addition the storage facilities will also be rodent and insect proof to ensure there is no damage to paddy or rice stocks.

surplus or commercial borrowings to cover part of the cost of a conventional warehouses amounting to \$2.5 million. The balance amount will be financed by PPCR concessional funding (\$1 million) and ADB's PSOD loan financing of \$1 million. Baitang already operates a large 100,000 ton capacity warehouse utilized to stock paddy as well as milled and refined rice. The company is committed to work with the government at both central and provincial levels to store and supply rice during emergency situations such as disaster relief, flood and drought. The additional climate proofed facilities will supplement government warehouses. The PPCR loan will serve to encourage private sector to invest and finance projects that integrate climate risk and resilience aspects especially in ventures that are capital intensive, have a low rate of return that is spread over a longer period of time. The PPCR concessional financing will increase the long-term financial sustainability of the project and its capacity to be scaled and replicated at other locations.

21. The lack of climate-proofed and pest resistant storage both at the farmland as well at centralized locations is one of the biggest challenges faced by the paddy and rice stakeholders. Losses in farm storage are estimated at 6%-7% of the total harvest and inadequate warehousing infrastructure at milling facilities account for a further loss of 3%. Milling losses are in the range of 4% - 5% as a consequence the total post-harvest losses average a minimum of 14% but are reckoned to be closer to 20% in most cases. Insufficient storage facilities compel farmers to sell paddy at low prices and inhibits them from selling at higher values during the dry season. Storage infrastructure is required for dried paddy prior to milling, and rice for consumption and sale. In addition storage facilities are also used to store agricultural inputs such as seed, fertilizers and pesticides. All grain needs to be securely protected against damage from rodents, insects, birds and adverse weather conditions (especially precipitation and high humidity levels). Climate proofed warehouses with hermetic bags for storage and equipped with modern loading and unloading infrastructure is a critical requirement to preserve the quality of the produce and prevent spoilage.

### ***Infrastructure: Biomass Plant***

22. This is a non-PPCR component of planned ADB's non-sovereign assistance to Baitang, and aims at reducing energy and waste disposal costs, and increase the financial viability of the project. Commercial funding of \$2.5 million would be used for the construction of a 3MW biomass plant at Baitang main complex in Battambang. The total cost of the plant is estimated at \$4.5 million. Baitang will raise \$2 million to cover the cost of the plant from its own resources or from commercial borrowing.

23. Energy in Battambang is sourced through the Thai grid and is of inadequate quality, unreliable and expensive. Cambodia has one of the highest power tariffs in the world thus severely impacting the competitiveness of its industrial activities. The prevailing cost of conventional energy is identified as a significant contributor to the high processing cost of paddy, thus making the Cambodian rice relatively uncompetitive in the export markets. Baitang's produces a large quantity of rice husk as a by-product of its milling activity. Combusting the husk would reduce energy and waste disposal costs. Baitang's existing energy requirement is 2.8 MW is procured at a tariff of \$0.187 kWh as compared to an average tariff of \$0.07 in Thailand and \$0.085 in Vietnam. The availability of abundant rice husk presents a cost effective opportunity to produce energy from biomass, reducing the unit cost down to \$0.05 kWh. Only a fraction of the husk is sold and the rest is poured into landfill areas or ponds without processing. Savings in energy and waste disposal costs itself would recover the cost of installing a biomass plant within a period of 3 years.

### ***Project developer***

24. Baitang (Kampuchea) is a public limited company that was established in 2008 in the Battambang province. Even though this province is a major producer of rice it is considered most vulnerable from a drought, flood and salinity perspective. The company has focused on setting up the Baitang community or Green community of farmers that it supports through small loans and credit facilities, agricultural inputs including extension services and setting up paddy collection markets. It provides post-harvesting value added services through its drying facilities (700 t/day), milling plant (480 t/day), refining (720 t/day), packaging unit (all sizes PE, PP Jumbo and bulk container), and storage warehouse for paddy and milled rice (100,000 tons). It is also equipped with an in-house laboratory to test moisture content, varietal aspects and maintain quality control to ensure conformity with domestic and international standards and certification. The company is substantially owned (50%) by an entrepreneur and four other partners with shareholdings ranging from 10% - 20%. Baitang is professionally managed by a board of directors and is headed by Dr Phou Puy who is the Board Chairman and the General Manager of the company. He is also the President of the Battambang Chamber of Commerce and the Federation of Cambodian Rice Millers Association in Battambang province. Three Deputy General Managers responsible for credit, production and finance divisions, assist him in the day-to-day operations. Baitang has 150 fulltime employees (in addition to 5 managerial level positions), of which 110 work in the agricultural division and 40 work in the credit division. Baitang employs at least 50-70 part-time labor during the harvesting season to assist in the procurement, drying, milling and packaging processes.

25. For the year ending December 2013 Baitang held total assets of \$ 26.80 million, most of which was funded through equity apart from a loan of \$5 million. The company achieved a net profit of just under a million dollars. KPMG are the company auditors and are in the process of restructuring the accounting statements and procedures to make them compliant to internationally accepted accounting practices.

26. Baitang has expanded its community membership to over 65,000 farming households but given the availability of resources it is only able to extend short term credit facilities ranging from \$100-\$5,000 to be utilized for purchasing agricultural inputs, equipment or other related requirements, to about 6000 members. Total current credit provided is \$2.9 million that is lent to farmers at interest rates averaging 12%-15% p.a. depending upon the level of assessed credit risk. Baitang has a well-structured credit department that is supported by field representatives and credit evaluation staff at the head office. The loans are usually granted for a period of a year and are approved based on independent credit worthiness evaluations undertaken by the field and head office teams. There is negligible delinquency as stringent credit appraisal and ability to pay assessments are in place.

27. Baitang procures paddy from its members on a preferential basis by paying near market values. Its members are however free to sell paddy to either the company directly or to other traders in the market. Procurement is either done at the main 16.2 hectare facility where farmers bring paddy directly and obtain the best price as no middle men are involved or collected at the farm gate through Baitang representatives assigned to buy good quality paddy for its rice processing facility. The company purchased 70,000 tons of paddy during the 2012-13 and is constrained in increasing its procurement due to a lack of working capital funds. Refined rice is

sold through agents to both domestic and export markets and the Baitang brand is increasingly recognized in the market.

28. Baitang intends to expand its operations by enlarging its Green community to service from 4,000 and 2,000 members to 35,000 and 15,000 members in Battambang and Pursat provinces respectively. It aims to enhance its production and storage facilities by creating climate resilient infrastructure that will ensure lower waste and higher yields. This will lead to higher livelihood levels and increase the adaptive capacity of the Green community to climate variability. Baitang's vision and objectives are:

- Expansion of the Baitang community to 50,000 farmers covering a farm area under paddy of over 105,000 hectares so as to procure a reliable supply of good quality paddy of a uniform variety;
- Provide small loans to Baitang community farmers for paddy production inputs and for related home-based business to supplement incomes;
- Supply agricultural inputs such as paddy seed, fertilizer, pesticide, and small farming and irrigation equipment to Baitang community members;
- Provide loans for developing climate resilient and pest resistant infrastructure such as small storage facilities;
- Provide financial and technical support to improve, enhance and rehabilitate irrigation facilities, improve water catchment areas, introduce water-use efficiency techniques, implement appropriate land management practices to increase cultivable areas, reduce dependence on a single crop, optimize yield and reduce food security risks;
- Set up a community of purified and high quality climate resilient seeds to produce high quality paddy;
- Expand paddy collection areas to cover more farmers using modern logistics supply chain management systems and equipment to reduce wastage and maintain the quality of paddy;
- Expand drying facilities and establish large climate resilient and pest resistant warehouses with modern packaging systems;
- Set up a biomass plant to ensure reliable supply, reduce reliance on expensive conventional energy and reduce processing cost;
- Increase employment opportunities for the local community through expansion of infrastructure facilities and introduction of new technologies.
- Establish a one-stop Paddy Bank to provide insect and rodent free, climate proofed storage facilities to farmers, traders and millers. Facility to be utilized by a commercial bank as a bonded warehouse to collateralize paddy so as to provide credit finance for expansion and extension activities;
- Create awareness among Baitang community and other farmers of the adverse effects of climate change and its impact on their livelihood and food production;
- Provide agricultural extension support to community members to learn productivity and yield enhancing techniques and applications.
- Disseminate information relating to temperature, rainfall, flood control, drought monitoring, early warning systems, level of agriculture and health impacted by climate change within the coverage areas.

## **b. Innovation**

29. The project seeks to change farmers' practices from traditional to modern cultivation methods and from subsistence to commercialized rice processing facilities. It introduces the concept of creating integrated paddy farming communities (Green Community) linked to a major rice processing facility that provides them the option and the commercial independence to either sell the paddy to the miller or to a trader of their choice. Baitang's rice processing facility provides a range of financial, technical and social benefits to reduce the climate and economic vulnerability of smallholder farmers by imparting skills, providing technical advice, introducing productivity enhancing systems and modern agricultural practices and providing short term affordable loans. The various components of this project provide a seamless path to deliver optimal farm production and processing gains to make Cambodian rice more competitive in domestic and export markets. The implementation of this integrated project will contribute to address some of the constraints identified in the Rice Policy that impact the quality, quantity, pricing and marketability of rice in Cambodia.

30. The creation of the Baitang community is an innovative concept that demonstrates private sector initiative and willingness to invest in farming communities and finance the establishment of scaled and adequately equipped rice processing facilities. A socioeconomic partnership and bond has been created between the miller and the Green community members with both parties benefiting from this alliance. Baitang seeks to create a large vibrant and cohesive Green community spanning more than one rice producing province. Its business model is collaborative and aims to meet the primary financial and technical requirements of the smallholder farmer. In addition to the supply of agricultural inputs, Baitang also provides its members with some basic household consumer products such as detergents, soap, beverages, etc., as part of its extension services. Baitang directly imports the products and the price advantage is passed to its extended community members. The short-term loans provided by Baitang have resulted in improving the livelihood levels of its members and there has been a conscious effort to provide loans to other members that could not be accommodated in previous years provided they meet the credit worthiness criteria. The absence of bad loans or non-repayment exemplifies the operation of a well administered credit regime run on professional financing terms and conditions.

## **c. Technology, Product, and/or Business Model**

31. The project will promote a viable commercial business model centered on technically sound and modern drying, milling, refining, grading, packaging and storage solutions. The model positively impacts farming communities and is financially viable for its private sector investors. The project thus generates both private and public benefits. Baitang's company structure, current governance framework and operational model promote transparency and enable farming communities to capture additional value for their produce. It also instills loyalty amongst the Green community members and provides the company with a reliable supply of quality paddy despite the fact that collectors increasingly approach farmers during the low or dry season. In providing agricultural and consumer product extension services, technical assistance and short term loans to its community members the company has established a dedicated community and both Baitang and its members are mutually dependent upon each other to achieve higher quality, productivity and profits. The business model is sustainable as it is less susceptible to market fluctuations as it includes a strong technical component that constantly strives to enhance productivity through better

farming practices and the provision of farm inputs including equipment. The focus on increasing productivity at the farm production and processing is evident throughout the business model thus making it financially sustainable and capable of being replicated and scaled.

Baitang has installed reputed commercialized equipment at its processing facility in Battambang. The equipment is mostly fully automated and requires minimal human intervention during the processing. The paddy or grain dryer has been procured from Suncue (Taiwan) and the milling and refining equipment has been sourced from Satake (Japan). The latter is considered an industry leader in rice milling equipment and manufactures both individual and integrated systems that are engineered to provide complete solutions.

32. The business model envisages that non-grant PPCR set aside concessional financing will be provided directly to Baitang for providing small loans to farmers to make climate resilient agricultural investments. Baitang, through its credit evaluation and collection team, will take responsibility for the administration and repayment of the loans. As the small loans have a tenor of one year the risk is limited with no grace period on principal repayments. The concessional lending for infrastructure development is based on Baitang's utilization and success of its existing facility.

33. The project will contribute to meeting the demand for modern drying facilities that can handle large quantities of paddy and with a clear revenue stream model. Farmers or traders are anxious that paddy should be dried at the very earliest immediately after harvesting and a proper drying process ensures not only reduces wastages but ensures higher realizable value for the paddy crop. Given the quantum of paddy produced and the existing demand, the drying facility will be fully utilized during the harvest season at both Battambang and Pursat province locations. As Baitang is funding the cost of one drying unit from its own resources the business model is both robust and sustainable. Repayment of the concessional loan facility will be guaranteed against incoming revenue streams and existing equipment.

34. The warehousing facility also operates on a similar revenue model as income streams from storage, handling and related warehouse and logistics services will ensure a steady year round cash flow.

#### **d. Sustainability of intended results**

35. The project is well integrated and covers the entire rice value chain from production to market. It is sustainable from a programmatic, financial and social perspective. From a programmatic point of view it is completely aligned with the Cambodia's Rice Policy, its Strategy for Agriculture and Water (2010-13), CCCSP and NAPA. It leverages on the government's policy directive and target to develop rice processing facilities to achieve a net export of 1 million tons by 2015. It builds on existing ADB efforts in Cambodia, and the enabling environment that has been established with changes in the regulatory frameworks and closer cooperation between ministries.

36. The project is financially sustainable because at every stage of the rice value chain sustainable components have been added to make it viable so that it can independently support itself and remain self-sustaining. There is a strong emphasis on reducing input costs at the production and post-harvest stages by supporting better water-use management practices. At the sales level considerable attention is devoted through quality control to assure that marketed products conforms to international standards. Baitang's links with both domestic and international

trading entities enable it to have an assured market for its products. These practices, coupled with Baitang's existing profitable operations, will result in long term savings and higher yields thus ensuring the financial sustainability of the project without recourse to additional external financing support.

37. The project is technically sound as it has been conceived and will be implemented as an integrated rice processing facility. Community participation and inclusiveness through agricultural extension services and financial support assures a steady supply of quality paddy. Modern integrated processing equipment guarantees good and consistent quality rice. The rice processing plant though integrated is also modular and can be operated as individual profit and technical centers, each providing a different output and securing its own revenue stream. For example the drying, processing and packaging units could all be operated as a seamless processing facility or as individual units for farmer and traders seeking specific services.

38. The project's results are sustainable in the long term because the developer has established a business model based on engagement with local communities to pursue shared goals of increased economic growth, inclusive social benefits and environmental sustainability. A vibrant Green Community exists and the model can be both scaled up as well as replicated in other areas. The expansion of the Green community concept can be easily achieved and its sustainability will be greatly enhanced with scale.

#### **IV. Inclusivity**

39. The project will directly impact smallholder farmers in the Battambang and Pursat provinces. Battambang has an estimated population of 1,024,663<sup>17</sup>, spread among 13 districts, 95 communes and 741 villages while Pursat with a lower population of 397,107 is spread over 6 districts, 49 communes and 502 villages<sup>18</sup>. The growth rate of population showed an increase of over 2% in Battambang and 1% in Pursat. While rural population growth rates were constant, Pursat had a negative urban growth rate thus pointing to migration of population to other provincial areas to secure alternate livelihood and employment. The national average household size has decreased from 5.2 in 1998 to 4.7 in 2008 – a factor that could be attributed to smaller nuclear families and the relocation of families consequent upon employment in other provinces of the country. Battambang has an average population density of 84 people/km<sup>2</sup> (national average is 75 people/km<sup>2</sup>) but Pursat has a relatively low population density of 31 people/km<sup>2</sup>. Rural households in Pursat have limited access to agricultural land for crop production in general. As in Battambang, small landholdings and other factors inhibiting crop productivity limit the availability of adequate produce for many rural households. As a consequence the rural population in both provinces experience a high level of poverty, low levels of income generation and high unemployment. 31% and 34% of households had land holdings of less than 1 hectare and 35% and 42% had agricultural land between 1-3 hectares in Pursat and Battambang respectively.

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<sup>17</sup>. General Population Census of Cambodia, 2008.

<sup>18</sup> Economic Census of Cambodia, 2011

40. Consumption poverty<sup>19</sup> is high (Battambang 27%, Pursat 34%), and a third of the households were below the consumption poverty line and with over 32% being in the poorest two national quintiles of national consumption. These households struggle to have enough cash available to buy food needs on the market and to meet other expenditure needs such as health services.

41. The populations in Battambang and Pursat also suffer from a lack of physical assets that can generate household income. Most of the population works in the agricultural sector (over 70% in Pursat and 55% in Battambang) have low levels of literacy (ranging from 64% in Pursat to 74% in Battambang) and find it difficult to secure reliable income (only 34% of the labor force is active). Households without land are dependent upon wage labor to generate cash income to buy food and other basic needs. However wage labor mostly comes from the informal sector, is unregulated, casual and often low paid (a typical example is agricultural casual wage labor).

42. The project would specifically provide assistance to farmers with small landholdings. These farmers are typically poor, have little formal education, and depend on rice, corn or cassava cultivation, which provides low income and leaves farmers vulnerable to price volatility. The project would directly benefit this group through improved income earning potential, better income security and increased livelihood protection. Baitang, through its own limited cash resources is able to provide small loans to 4000 community members in Battambang and 2000 members in Pursat. The infusion of \$4 million as PPCR concessional loan will enable it to immediately service about 20,000 members. The short term (annual tenor) loans will be rotated to other community members and the corpus will be incrementally supplemented through interest earnings to service 50,000 members within a period of 3-4 years. The tenor has deliberately adopted a shorter tenor period as it ensures that accessibility to credit and benefits of the short term loan are extended to a larger community base. It also leads to a balanced economic prosperity within the community. Baitang is well aware that longer-term loans only benefit a fraction of the farmers thus creating imbalances and economic disparity amongst the community. It is anticipated that, over time as the agricultural sector is strengthened, modernized and expanded through projects such as this, greater benefits will flow to rural communities, and basic indicators such as household incomes and levels of wealth will increase.

43. In Cambodia, there is traditionally a high degree of participation by women in the agricultural sector and women make up 65% of farmers, directly contributing to the country's food security and the national agricultural output<sup>20</sup>. In line with national trends, the project will give priority to women by allocating at least 30% of microcredit options to female small farm holders. The project will also enhance women's capacity for income generation in production activities such as planting and in post harvest activities such as threshing.

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<sup>19</sup> Consumption poverty refers to having insufficient cash income (or its equivalent in kind) to meet basic livelihood needs. This includes having insufficient cash income to buy foods that people need for an adequate diet as well as cash income to buy other basic needs such as shelter, clothing, health and education. This lack of market purchasing power can be an important cause of food shortages and protein-energy and micro-nutrient malnutrition in the province population.

<sup>20</sup> United Nations Development Program, 2011. Promoting Climate Resilient Water Management and Agricultural Practices in Rural Cambodia, December 2011.

44. The project is likely to generate a minimum of 55 new fulltime employment opportunities including 2 at managerial levels and at least an additional 150 part time jobs during the harvesting season. The agriculture division may employ 25 staff and 20- new employees will augment the Credit division. The biomass plant may require an additional 10 employees depending upon the technology adopted and the operational schedule of the facility.

#### V. Financial Plan (Indicative):

45. The project investment will be funded by a combination of PPCR private sector set aside financing, borrowing from ADB's Private Sector Operations Department and a combination of equity and commercial borrowing of the project sponsor. Total PPCR funds requested in this proposal amount to \$5 million (25% of the total project cost), ADB commercial lending will amount to \$5.5 (27.5%) and Baitang will contribute \$9.5 (47.5%) from its own resources.

**Table 1 - Sources and uses of funds**

Uses of Funds				Sources of Funds		
Item		\$ million		\$ million		Party
1	Credit Line	7.0	37%	4.0	57%	PPCR
				3.0	43%	Baitang
2	Paddy Drying Facilities	4.0	20%	2.0	50%	ADB
				2.0	50%	Baitang
3	Warehousing	4.5	22.5%	1.0	22%	PPCR
				1.0	22	ADB
				2.5	56%	Baitang
4.	Biomass Energy Plant	4.5	22.5%	2.5	55%	ADB
				2.0	45%	Baitang
<b>Total</b>		<b>20.0</b>	<b>100%</b>	<b>20.0</b>	100%	

#### VI. Expected Results and Indicators<sup>21</sup>

PPCR Core Indicator	Corresponding Project Indicator(s)	Expected Result(s)
<i>1. Number of people supported by the PPCR to</i>	Number of households whose livelihoods have	50,000 rural households (existing baseline of 0)

<sup>21</sup> Specific targets will be determined during detailed design.

<i>cope with effects of climate change</i>	improved as a result of the project	<p>Increased usage of agricultural inputs by at least 50% of the new 50,000 Baitang members (baseline of 6000).</p> <p>Procurement of mechanized farm equipment for threshing and harvesting, climate resilient silos for on-site storage by 25% of members.</p> <p>25% increase in the number of households with alternate livelihood during idle periods after cultivation.</p>
2. Quality of and extent to which climate responsive instruments/ investment models are developed and tested.	<p>Responsive measures are tested and scaled up within the rice value chain through:</p> <ul style="list-style-type: none"> <li>- integration of production, processing and marketing;</li> <li>- use of modern equipment and climate resilient technologies;</li> <li>- climate proofing facilities;</li> <li>- access to credit;</li> <li>- extension services;</li> <li>- procurement and distribution of quality seeds;</li> <li>- establishment of Green communities</li> </ul>	<ul style="list-style-type: none"> <li>- 300,000 tons of climate resilient storage capacity installed</li> <li>- 1000 tons capacity of grain dryer installed</li> <li>- 20,000 short term loans to strengthen adaptive capacities disbursed</li> </ul>
3. Extent to which vulnerable households, communities businesses and public sector services use improved PPCR supported tools, instruments, strategies, activities to respond to CV&CC	PPCR supported tools, instruments, are used to build climate resilience of to respond to CV&CC	Number of climate responsive technologies and measures adopted by farmers (specific targets will be determined during detailed design)
4. Degree of integration of	Private sector delivers	\$4,000,000 disbursed in loans

climate change in national, including sector planning - e.g., national communications to UNFCCC, national strategies, PRSPs, core sector strategies, annual development plans and budgets, and NAPs	financial services and products that support national climate resilience objectives (SPCR, CCCSP, Rice Policy, etc.)	for climate resilient measures  % of all loans are to either women or enterprises with a minimum of 50% ownership by women (TBD)
5. Evidence of strengthened government capacity and coordination mechanism to mainstream climate resilience	Progress on policies to improve milling and rice quality standards	Number of consultations between target communities, line ministries and regulators  % increase in rice exports (TBD)

## VII. Implementation Arrangements and Feasibility

46. The projects will be implemented by Batang, and the loan will be administered by the Private Sector Operations Department of ADB. Full feasibility and assessments will be undertaken after PPCR Sub-Committee approval of the concept note. PPCR Sub-Committee approval of the project is expected in the first quarter of 2015.

## VIII. Potential Risks and Mitigation Measures

Potential Risk	Mitigation Measures / Actions
<p><b>Credit Risk</b></p> <ul style="list-style-type: none"> <li>Local Farmers may not be able to repay the short term loans extended to them through Baitang.</li> <li>Baitang may not be able repay the PPCR funding loans</li> </ul>	<ul style="list-style-type: none"> <li>Baitang has a well-established credit assessment mechanism that is serviced by its teams based in the field as well as at the head office. Farmer credit worthiness is carefully evaluated to determine ability to pay. Quantum of the loan approved is based on this assessment. Baitang's field team undertake collection as per the repayment schedule and there is little or no delinquency till date. The loans are usually advanced against collateral which may include land, farming equipment or crop. With increase productivity through crop intensification measures and higher quality yield by using agricultural inputs the farmers will become less vulnerable to food and livelihood security issues. The small loans will also assist farmers in developing alternate means of income thus generating adequate cash flow to repay the small loan. Further, as the loan is being financed through Baitang the onus of credit collection is on the company in the first instance as it has been guaranteed by Baitang.</li> <li>Baitang has a robust balance sheet and the shareholders have invested \$18 million of their own capital into the company. Existing Borrowings currently represent less than 20% of the total asset value. It is a profitable company with an established track record and has the capacity to provide sufficient collateral to guarantee the loan financing.</li> </ul>

Potential Risk	Mitigation Measures / Actions
<p><b><i>Technology Risk</i></b></p> <ul style="list-style-type: none"> <li>• Selection of equipment, creation of over capacity and inability to operate the equipment.</li> <li>• Rice Husk feed Biomass plant</li> </ul>	<ul style="list-style-type: none"> <li>• Baitang has currently installed one of the best integrated rice processing plant equipment (Satake – Japan) which is considered an industry standard. It has successfully operated this equipment and is now seeking to supplement its drying capacity. There is a strong demand for increasing drying capacity during the harvesting seasons. With more dry season crop being available in the coming years as a consequence of irrigation networks the dryers will be fully utilized. Baitang has trained technical staff to operate the equipment and it currently producing good quality processed rice.</li> <li>• This is a well established technology that is in operation all over the world. Baitang considering the selection of a combustion model as it is considered superior and does not have issues related to waste water and ash.</li> </ul>
<p><b><i>Implementation risk</i></b></p> <ul style="list-style-type: none"> <li>• Risks include cost overruns, delays in procurement and failure to achieve expected technical and other beneficial outcomes</li> </ul>	<ul style="list-style-type: none"> <li>• Baitang has the already procured land for the expansion of existing and the establishment of new facilities. It has undertaken similar activities previously and has the necessary project management experience. Cost overruns at this stage are not likely as the estimates provided by Baitang are based on its own previous experience plus fresh quotations received from select suppliers. There is adequate gestation period between the time the planning and execution stage to ensure that procurement delays do not occur. The small loan facility could be operational almost immediately as Baitang already possesses an updated database of its members who seek credit facilities but cannot be services because of the existing fund volume constraints. Baitang possesses the necessary institutional capacity and procedures to implement the credit scheme.</li> </ul>
<p><b><i>Policy and Regulatory Risk</i></b></p> <ul style="list-style-type: none"> <li>• Project is not aligned to national policies, or comply with the regulatory framework; changes in policies could have adverse impact on the project outcome and return on investment</li> </ul>	<ul style="list-style-type: none"> <li>• The project is completely aligned to Cambodia’s Rice Policy, Strategy for Agriculture and Water, CCCSP and the NAPAs. It satisfies the objectives set out in these policy documents and seeks to fulfill government’s target to increase rice milling processing facilities and achieve a net export of 1 MT by 2015. The project introduces enhancements to increase yield per ha, reduce wastage and make Cambodian rice more competitive in the international markets. Rice Value Chain constraints have been identified and necessary adaptation measures will be implemented to achieve returns. The existing enabling environment in pursuance of the national policies will be leveraged. Changes in regulatory policies such as duties and taxes will no doubt adversely impact returns on investment.</li> </ul>