CASE STUDY #1: Establishment of PGS for quality rice seed and PGS implementation by AKAC

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1. Overview of the PGS establishment for quality rice seed production and commercialization by ACs

This case study is to document the set-up of Participatory Guarantee Systems (PGS) for quality rice seed production and commercialization of AC (Agricultural Cooperation), established with support from AFSA (Agriculture Familiale et Souveraineté Alimentaire) program during 2015-2016 and from UPSCALE program during 2017-2021. The main purpose of PGS establishment for quality rice seed was to promote the multiplication and use of quality rice seed amongst small-scale family agriculture farmers (represent the majority of Cambodian farmers) in order to contribute to increase the supply of quality paddy which is demanded by higher value-added export markets in developed countries as well as to contribute to respond the national rice export policy set by the Royal Government of Cambodia (RGC). To recall, in 2015 RGC set a target for 1 million tonnes of rice exports by 2020. To meet this target, some improvement need to made on each chain of the rice value-chains of which quality rice seed was identified as the key constraint for having paddy rice with quality required by higher value-added export markets in developed countries. Beside in Cambodia, up to 2015 still there was little interaction between rice millers and rice farmers, beyond market transactions, which often occur through collectors. However, as the rice sector transforms, particularly from informal export of unmilled/unprocessed rice (to neighboring countries who will then re-export after processing) to formal export of milled/processed rice directly to final import countries, closer and stronger collaboration between rice producers (and/or producers organisations - AC) and rice millers, is needed in order to increase the supply of higher quality rice required by direct export market. Rice millers havediscovered that new drying and milling equipment can only improve milled rice quality to a degree, this is because the paddy rice entering their mills (supplied by rice farmers/ACs) is not uniform, resulted to have milled rice without uniform which is not compliant with the standard required by direct export market. According to diagnosis conducted by experts, the non-uniformity of paddy rice caused by rice seed with low purity rate. This is because traditionally

farmers have recycled their rice seed for many years. In most areas, the harvested paddy rice is a mixture of varieties with different milling characteristics. Milling this highly variable paddy rice grains reduces milling efficiency and the quality final product. Consequently, it was concluded that using improved / quality rice seed is the most cost-effective way to increase the uniformity of the milled rice. This dynamic was also a factor leading to have a stronger linkages between rice millers their suppliers (mainly small-scale family agriculture farmers).

In response to the country's need to increase the supply and to promote the use of quality rice seed, **Akphivath Kasekor AC, AKAC in short** (located in Cheung Prey district, Kampong Cham province) was selected in 2017 as one amongst the 36 target ACs supported by ADG (currently ECLOSIO), CIRD and FAEC through their AFSA and UPSCALE programs on quality rice seed production and commercialization. For this purpose, PGS was identified and selected as an appropriate quality control and certification system ensuring the seeds users (rice miller-Amru Rice and paddy rice farmers) to have access to quality rice seed with a system of quality guarantee.

2. The origin of the action

Considering the above-mentioned needs, potentiality, and challenges faced by Cambodia rice sector, in 2015 ADG (currently ECLOSIO), CIRD and FAEC through the AFSA and UPSCALE programs have included the support to potential target ACs on **quality rice seed production and commercialization** as a component of the two programs. First, AFSA program (a program funded by DG-D) provides technical and methodological supports to nine agriculture cooperatives to produce high quality rice seed (in 22 villages in 5 provinces) and promote the use of high quality rice seeds amongst farmers inside and outside the seed production areas, through a sustainable market mechanism. However, to encourage the use of quality rice seed by paddy rice producers we need to address the question of quality assurance on seed produced by specialized rice seed producers trained by the programs. Internal quality control and certification by seed producers ACs themselves are not enough to build trust amongst seed users. External or third-party control and certification on rice seed quality cannot be found or if have one, it will be an additional cost leading to increase the price of quality rice seed for paddy rice farmers. Consequently, Participatory Guarantee Systems (PGS) was seen as an alternative option for rice seed production ACs. Participatory Guarantee Systems (PGS) are locally focused quality assurance systems. They certify producers based on active participation of stakeholders and are built on a foundation of trust, social networks and knowledge exchange. PGS represent an alternative to third party certification, especially adapted to local markets and short supply chains. They enable the direct participation of producers, consumers and other stakeholders in:

- The choice and definition of the standards,
- The development and implementation of verification procedures

- The review and decision process to recognize farmers as members of the system

To ensure the quality of rice seed produced, aiming at building trust amongst seed users, during 2015-2016 the AFSA program provides technical and facilitation support to seed producers and stakeholders in establishing a Participatory Guarantee System (PGS); a control and certification system participated by seed producers (3), officials from District Office of Agriculture (DAO – 2), one representative from rice miller, representatives from Agricultural Cooperative (3), seed producers (3), and seed users (3). This is the first PGS established for controlling and certificating the quality of rice seed produced. From 2017 onward through UPSCALE project, CIRD and FAEC experts continue to provide capacity building support to the target ACs in implementation of PGS on quality rice seed and up to end of 2020 the PGS have been introduced to 36 ACs implementing rice seed business in 11 provinces of Cambodia. To enhance the efficiency of high quality rice seed promotion, UPSCALE has developed different promotion tools such as Branding, Certification, Packaging, and Communication.

3. The stakeholders involved in PGS implementation by AKAC

The establishment and implementation of PGS on quality rice seed by AKAC involve 8 main groups of stakeholders as described in the table below:

Table 1: Stakeholders involved in PGS implementation for rice seed produced by AKAC

Stakeholders	Role / Function	Main Tasks
Akphivath Kasekor AC (AKAC)	Quality rice seed supplier	- Identify and select farmers members to be specialized in rice seed production - Provide technical support to specialized seed producers - Participate in developing seed quality standard and quality control as part of PGS inspection and certification process - Collect and commercialize the quality rice seed produced by specialized seed producers members - Distribute quality rice seed produced to paddy rice producers (both AC members and non-members) - Collect paddy rice produced by farmers who use quality rice seed distributed - Supply the quality paddy rice collected to miller (Amru Rice) base on Contract Farming.
Specialized rice seed producers	Members of AKAC	- Participate in trainings and meetings organized by CIRD and FAEC's trainers

Stakeholders	Role / Function	Main Tasks
		on both seed production techniques and quality control following the control plan, process and method adopted by the PGS team - Produce rice seed following the recommended technical itinerary to ensure the compliance with seed standard required by PGS - Implement internal control process required by the PGS developed - Supply seed to AKAC and 2 other ACs partners (Reamea Cheung Prey AC and Aphiwat Phum Yeung AC) base on agreement through a contract farming.
FOs Federations (FAEC)	Umbrella of AC members including AC-Akphivath Kasekor	Support AC-Akphivath Kasekor in implementing their tasks, particularly on quality rice seed standard development, production techniques and marketing of Puch Srov Yeung seed brand to potential buyers in other areas covered by FAEC members
Reamea Cheung Prey AC and Aphiwat Phum Yeung AC	Buyers and Inspectors	- Participate in developing seed quality standard and quality control as part of PGS inspection and certification process - Buy quality rice seed from AKAC and distribute to paddy rice farmers including both AC members non-members - Collect paddy rice produced by farmers who use quality rice seed distributed - Supply the quality paddy rice collected to miller (Amru Rice) base on Contract Farming
ECLOSIO and CIRD through AFSA&UPSCALE programs funded by DG-D	Support organizations	- Provide technical assistance to both FAEC and its AC members including AKAC in PGS establishment and implemetation - Facilitation of stakeholders consultation - Business match making support - Financial support for the process

Stakeholders	Role / Function	Main Tasks
Rice Miller/Exporter (Amru Rice company)	Buyer and Inspector	- Participate in developing seed quality standard and quality control as part of PGS inspection and certification process - Buy paddy rice from farmers who use quality rice seed distributed, through Contract Farming with their ACs
Paddy rice farmers	Seed users/Paddy rice producers	- Use the quality rice seed supplied by AKAC, Reamea Cheung Prey AC and Aphiwat Phum Yeung AC in producing quality paddy rice - Some supply the quality paddy rice produced to Amru Rice company and some supply to AKAC, Reamea Cheung Prey AC and Aphiwat Phum Yeung AC
Rice expert from district office of Agriculture	Inspector and Trainer	- Participate in developing seed quality standard and quality control as part of PGS inspection and certification process - Provide training on quality rice seed production

4. The implementation process/history

The four main key process stages to establish and implement a PGS for quality rice seed produced ACs members of FAEC and FCFD are:

4.1. Stakeholders consultative workshops on PGS

As up to 2015 PGS was not yet widely known and applied in the country, ADG/ECLOSIO, CIRD and FAEC jointly organized a first introduction and consultation workshop on PGS which was conducted on 27 August 2015. The key concerned actors and stakeholders who participated in the workshop include:

- Representatives of 36 ACs (ACs leaders and their specialized rice seed producers)
- Representatives of 3 rice trading companies (Gooden Rice, AMRU rice, SoA)
- Rice experts and agricultural extension workers from different organizations such as ADG, AVSF, CIRD, COrAA, FAEC, FAO, …
- Rice experts/officers from government agency (GDA-Rice department) and from Agricultural Office of Oddong distrcit, Kampong Speu Province.

The main purposes of this first introduction and consultation workshop were first to introduce about PGS (what is PGS, why a PGS is needed? how does a PGS established and functioned?)

present on overview of PGS implementation in the world and discuss on how PGS can be established and implemented for quality rice seed in Cambodia, particularly amongst ACs members of FAEC and FCFD supported by AFSA (then followed by UPSCALE) program. As the result, some seed business ACs confirmed their interest to implement PGS and an initial action plan toward establishment and implementation of PGS for quality rice seed production and commercialization was developed at the end of the workshop.

Two years after having implemented pilot PGS on quality rice seed by 36 seed business ACs in 11 provinces, in 2017 UPSCALE had organized a second stakeholders consultative workshop in order to review the PGS implementation results (success, difficulties, problem encountered, challenges and opportunities) and discuss on key points to be improved for next years. The same participants of the first workshop were invited and most of them have participated in this second stakeholders consultative workshop.

4.2. Stakeholders working sessions to develop quality rice seed standard

After the first introduction and consultation workshop mentioned in the section #4.1 above, rice seed experts of CIRD and FAEC had organized and facilitated a working session with some key concerned stakeholders (AC leaders, rice seed producers, potential seed buyers and government officers) in order to develop community standard for quality rice seed which is belonging to the 36 target ACs members of FAEC and FCFD FO Fed. The community rice seed standard was developed based on market requirement for quality of paddy rice for direct export to higher value-added markets in developed countries. As the result, the quality standard adopted by the PGS is the following:

Table 2: Standard of quality rice seed to be certified by PGS

Criteria for evaluation	**Level of requirements by category**	
	Registered seed	**Certified seed**
Minimum purity rate of the seed (%)	97	95
Maximum content of inert matter (%)	3	5
Grains of weed (maximum number per 500g of rice seed)	10	15
Grains of other crops (maximum number per 500g of rice seed)	10	15
Rice grains of other rice varieties (maximum number per 500g of rice seed)	10	12
Rice grain with red color (maximum number per 500g of rice seed)	5	8
Germination rate (%) (Min)	85	80
Moisture content (%) (Max)	13	13
Rice grain with black color (maximum number per 500g of rice seed)	10	12

4.3. Stakeholders working sessions to develop Control and Certification Process, Method and Plan

After having jointly developed quality rice seed standard, a second stakeholders working session were organized and facilitated by UPSCALE rice seed experts (from CIRD and FAEC) in order to develop a control plan with process and methodology to be implemented by PGS control team. The same participants of the first working session were invited and participated in this second working session. The control plan was developed base on the criteria for quality evaluation mentioned in the table 2 above. Beside, to ensure the quality standard compliance of the rice seed produced by the target specialized rice seed producers, criteria for selection of inspectors and formation of inspection teams were also discussed during this working session. Additionally, the working session also discussed, finalize and approved on the common internal regulation of the inspection teams which was drafted by the experts before. A manual on "**Technical and Methodological Guidelines for the Control and Certification of Puch Srov Yeung through PGS"** was then prepared and distributed to the PGS inspection teams of the 36 target ACs.

Table 3: PGS Control and Certification Plan for quality rice seed (Puch Srov Yeung brand)

N.	Key activities and process	Frequ-ency	Months											
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
I	Review and planning meeting of inspectors team of each AC	1												
II	Training/refresher training of inspectors	2												
III	Conduct on-farm inspection:													
	First inspection (seedling stage)	1												
	Second inspection (tillering stage)	1												
	Third inspection (maturing stage)	1												
IV	Examination and evaluating rice seed grains:													
	Check on cleanliness and purity	1												
	Check on germination rate	1												
V	Market monitoring and market promotion	2												

4.4. Stakeholders working sessions to develop marketing strategy

In order to support the target ACs in commercializing the quality rice seed produced by their members, UPSCALE project organized a series of stakeholders working sessions to develop a common marketing strategy to be implemented by FO Feds (FAEC and FCFD). To enhance the efficiency of high quality rice seed promotion, the project has also supported in development of different promotion tools such as Branding, Certification, Packaging, and Communication.

To properly manage the quality standard and quality sign certified by the PGS as well as to facilitate market promotion, a brand name of "**Puch Srov Yeung**" was also designed for using on the bags / packs of quality rice seed produced by the 36 target ACs and certified by PGS.

5. Operational results and situation in 2019: Case of PGS implementation by AKAC

Akphivath Kasekor AC (AKAC) is a member of FAEC, started to implement PGS on quality rice seed production and commercialization in 2017 with support from UPSCALE project, a 5-year project (2017-2021) funded by DG-D and implemented jointly by ECLOSIO, CIRD and FAEC. Base in Saang village, Trapeang Kor commune, Cheung Prey district, Kampong Cham province, AKAC was established and officially registered in December 2016. At the foundation time, AKAC had 50

members with a capital of 2,000,000 Khmer Riels (100 shares of 20,000 Khmer Riels per share). Three core business were planned at the beginning: 1). Saving and credit; 2). Buying and reselling animal feed, and 3). Buying and reselling fertilizers. During the first two years after foundation, only the first business was well operated. After having supported by UPSCALE, during its annual general assembly in 2017 AKAC decided to create a new business on quality rice seed and quality paddy rice production and commercialization. For this new business, PGS was adopted as a tool for quality control, certification and market promotion.

To implement its 4th business plan, AKAC got the following start-up support from UPSCALE:

- 80 kg of foundation rice seed as seed capital to multiply as high-quality rice seed (certified seed) to supply to rice farmers who will produce and supply quality paddy rice to millers / exporters
- Trainings and coaching of its members who were selected as specialized rice seed producers on quality rice seed multiplication techniques
- A PGS inspection team established, trained and coached in conducting quality control and certification following the PGS quality control and certification process, methodology and plan developed for all target seed business ACs members of FAEC and FCFD
- As part of seed business ACs members of FAEC and FCFD, AKAK is entitled to use "Puch Srov Yeung" brand and label and all related market promotion tools (including bags / packs of rice seed with label and promotional content printed on) developed in commercializing the quality rice seed produced by its members.
- Seed business match making support.

The PGS inspection and certification team of AKAC comprises of 4 members: president of AKAC (1); Officer from Cheung Prey district office of agriculture (1); technical staff from AMRU Rice company (1); and representative from specialized rice seed producer (1). To implement their tasks, the team members are assisted by rice seed expert of CIRD (1) and rice seed expert of FAEC (1). As the results up to end of 2020, AKAC could produce and commercialize quality rice seed and quality paddy rice as the following:

- In the first year (2017) of quality rice seed multiplication, AKAK worked with eight rice seed producers who produced quality rice seed on 2.5 hectares of farmland and could produce 7.5 tons of rice seeds certified as "Registered Seed".
- In the second year (2018), the registered rice seed produced in 2017 was used to produce quality rice seed by 12 seed producers (members of AKAC) on 14 hectares of farmland and could produce 36 tons of quality rice seeds certified as "Certified Seed" (high quality to be used for quality paddy rice production).

- In the third year (2019), the cooperative supplied the certified seed produced to 200 paddy rice famers who produced paddy rice on 450 hectares of farmland and produced 1,350 tons of quality paddy rice of which 450 tons were sold to AMRU as SRP standard rice through a Contract Farming between AMRU and AKAC. The remaining were solved as quality paddy rice to other rice millers.

Up to end of 2019, AKAC had 75 members holding totally 140 shares of 20,000 Khmer Riels per share. To implement its 4th business on quality rice seed production and commercialization, AKAC got credit from outsider as additional capital.


6. Economic analysis

6.1. For seed producer level

Rice seed producers are the paddy rice farmers members of AKAC. Within seed business scheme, instead of using their farmlands to produce paddy rice, they use their farmlands to produce high quality rice seed. In this case, their business can be analyzed as the following:

Table 4: Income, Expenditures and Gross Profit on **1ha of farmland** (comparison between PGS quality rice seed production/business and paddy rice production/business)

No.	Cost items	Unit	Rice seed (PGS)			Paddy rice		
			Qt./Frequency	UC (Riel)	STC (Riel)	Qt./Frequency	UC (Riel)	STC (Riel)
1	Seed	Kg	35	14.000	490.000	100	2.500	250.000
2	Land preparation	Time	3	200.000	600.000	2	200.000	400.000
3	Gasoline	Litre	30	3.500	105.000	30	3.500	105.000
4	Chemical fertilizer	Kg	100	2.100	210.000	200	2.100	420.000
5	Cow dung	MT	3	200.000	600.000	2	200.000	400.000
6	Pesticide	Set	2	15.000	30.000	2	15.000	30.000
7	Cultivation	Time	1	350.000	350.000	1	350.000	350.000
8	Removing other varieties seedling	Time	2	40.000	80.000	0	0	0

No.	Cost items	Unit	Rice seed (PGS)			Paddy rice		
			Qt./Frequency	UC (Riel)	STC (Riel)	Qt./Frequency	UC (Riel)	STC (Riel)
9	Transportation	Ton	3	4.000	12.000	3	4.000	12.000
10	Cleaning seed	MT	3	40.000	120.000	0	0	0
11	Packaging	Set	150	900	135.000	50	900	45.000
12	Quality control & certification	Set	1	200.000	200.000	0	0	0
Total cost					2.932.000			2012000
Production and sell			Volume (MT)	Price (KR)	Income (KR)	Volume (MT)	Price (KR)	Income (KR)
			3.000	1.800	5.400.000	2.500	1.100	2.750.000
Total income					5.400.000			2.750.000
Gross Profit					**2.468.000**			**738.000**

6.2. For AKAC

In 2019, AKAC bought high quality rice seed from seed producer members at a price of 1.800 KR/Kg and reselling to other ACs (Reamea Cheung Prey AC and Aphiwat Phum Yeung AC) outside the commune at a price of 2.300 KR/Kg. The operation cost including collection fee, storage and packaging, lost, and delivery was calculated at 200KR/Kg. The margin of 200KR/Kg was distributed to AC as its capital (100KR/Kg) and to AC management committee members as incentive for their works. Due to lack of capital, in 2019 AKAC could collect and commercialize only 6 MT out of the 36 MT of high-quality seed produced. The remaining 30 MT was commercialized directly by the 12 seed producers to quality paddy rice farmers partners of AMRU Rice company.

Table 5: Income, Expenditures and Gross Profit of AKAC in 2019

Description	Volume	Unit	Unit price (KR)	Total price (KR)
Purchase of quality rice seed from seed producer members	6.000	Kg	1.800	10.800.000
Operation cost (collection, storage packaging, lost, and delivery)	6.000	Kg	200	1.200.000
Income from reselling the quality rice seed bought	6.000	Kg	2.300	13.800.000
Net profit (total, in KR)				**1.800.000**

6.3. For paddy rice producer

For paddy rice producers who used high quality rice seed supplied by the specialized seed producers, they could sell their quality paddy rice with an average incentive price of 100KR/Kg. Consequently, in 2019 the 200 paddy rice producers who produced and commercialized 1,350 MT of quality paddy rice, could get an additional value of 135.000.000 KR – (36 MT x 500.00KR/MT, the additional price for high quality rice seed used) = **117.000.000 KR (in average 585.000 KR per family)**.