United Nations Development Programme
Country: DEMOCRATIC PEOPLE'S REPUBLIC OF KOREA
Project Document

Project Title:	**Reduction of Post Harvest Losses for Food Security**
UN Strategic Framework (UNSF) Strategic Priority Area:	**Area 3. Nutrition**
UNSF Outcome(s):	**1: Improved Nutritional Status of targeted populations to enable them to lead healthy lives;** **2: Sustained Household food Security**
Expected CP Outcome(s):	**Increased access of people to diversified range of foods as well as farmers increasing agriculture diversification and productivity**
Expected CP Output:	**1.1. Agriculture productivity and diversification enhanced;** **2.2. Pre- and post- harvest losses reduced through applying recommended measures**
Expected Project Output(s):	**1. Project farms harvest losses reduced by 50 percent** **2. A validated set of recommendations and policies for reducing national post harvest loss** **3. Improved post harvest technology and management interventions promoted to a wider agriculture community**
Executing Agency:	**FAO**

Brief Description

The Democratic People's Republic of Korea's effort towards food security has been constrained by several factors notably the high level of loss in farm produce after harvest. The high rate of post harvest losses has been identified to have serious dampening effect on the country's efforts for increased agricultural productivity and food security. Several international agencies including the UNDP have been collaborating with the Government to reduce post harvest losses to improve food security. This project will focus on enhancing capability in post harvest handling of grains through introducing, testing, and optimizing improved, new and appropriate post harvest technologies, and raising skills development in the management, maintenance and repair of equipment at the county and farm levels. Demonstration farms will be established by the project, to raise the awareness of famers on strategic actions; and strengthen capacities in loss assessment.

This project was initially approved and signed in November, 2006, but was not implemented owing to suspension of all UNDP programmes in the Democratic People's Republic of Korea in March 2007. As per Executive Board directive, the project is to be resumed and this should start with a reformulation of the project document. The project document was consequently revised by FAO in 2010 to reflect changes that

Programme Period:	3 years
Key Result Area (Strategic Plan):	Nutrition
Atlas Award ID:	
Start date:	March 2011
End Date:	February 2014
PAC Meeting Date:	_____
Management Arrangements:	_____

Total resources:	USD 1 798 686
Total allocated resources:	USD 1 798 686
• Regular	USD 1 798 686
• Other donor	_____
○ Donor	_____
○ Donor	_____
○ Government	_____
In-kind Contributions:	_____

Agreed by (Government): Acting Secretary General, NCC
23 MAR 2011

Agreed by (Executing Entity): VINCENT MARTIN, FAOR a.i

Agreed by (UNDP): 22/03/2011

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LIST OF ACRONYMS

AAS	Academy of Agricultural Sciences
CFMS	County Farm Machinery Stations
CTA	Chief Technical Advisor
MoA	Ministry of Agriculture
NCC	National Coordinating Committee
PB	Project Board
PHMU	Post Harvest Management Project Unit
PDS	Public Distribution System
PHU	Post Harvest Unit
SPFS	Special Program for Food Security
UNDP	United Nations Development Programme
FAO	Food and Agriculture Organization of the United Nations

I. Situation Analysis

In order to achieve food security, the Democratic People's Republic of Korea has implemented a number of measures toward increasing national crop production. However, an additional strategy remains to be actively pursued, that of maximizing agricultural production by mitigating pre- and post-harvest losses, which are currently estimated to account for approximately 15 percent[1] of national production.

Problems in the post-harvest sector span a wide range of functions and disciplines. Their causes are complex as is cost-efficient strategy needed to overcome them. Causes of post harvest (PH) losses are also technological in nature - use of out-dated mills that result in a high percentage of broken grains, inadequate threshing machines that result in lost grain and badly paved, open lawns used for drying. Non-technological constraints also lead to losses. For example paddy is, left on the field over extended periods after harvest; there is unnecessary movement and handling of the harvested grain; there is also loss due to transport (see table below).

Types of PH losses:

(i) *Losses in weight*, resulting from physical loss of the commodity through, paddy falling to the ground during reaping or spillage during transportation.

(ii) *Quality loss that directly impacts the efficiency of processing* steps further down the chain. Changes in paddy quality, resulting from prolonged holding of the crop in the field after harvest, in threshing and in storage. This affects the percentage of whole grain obtained after threshing.

(iii) *Quality loss owing to an irreversible change in the smell, taste, or appearance* of rice maize, or wheat.

Post harvest practices undertaken at the farm, work team and sub-work team levels result in unnecessary and preventable losses. In most cases, there is limited awareness among farmers of the financial and economic implications of losses. Awareness of the potential solutions as well as management skills and technology required to effect improvements is, in the main, absent or not clearly understood. While physical losses are perhaps more readily identifiable, the qualitative losses are not. Farmers are often not aware of the impact of prolonged holding of crops after harvest in the field. Management skills and the application of technology to efficiently implement the various steps in the post-harvest chain is often either deficient or not available. Where equipment is employed to assist with the relevant post-harvest handling and processing operations, often the design or operational parameters are not entirely conducive to best means of processing the crop. Low threshing efficiency of farm built threshers for example results in grain loss. In some areas the required management and technology is not available.

Substantial losses are evident at all points in the post harvest chain from harvest to storage. Key points in the post harvest chain resulting in product loss for paddy, maize and wheat are summarized in the table below[2].

Step of the Post-Harvest Chain	Paddy (% of total loss)	Maize (% of total loss)	Wheat (% of total loss)
Harvesting	15	10	15
On-farm transport	35	30	25
Threshing	15	20	n/a
Drying	15	15	35

[1] Democratic People's Republic of Korea's Ministry of Agriculture and FAO's estimate:

[2] FAO's estimates:

Storage	**20**	**25**	**25**

Farmers (on the farms visited) in North Hwanghae, South Pyongan and Pongyang City receive their annual grain allowance in two tranches (October or November) shortly after harvest (often as unmilled grain) and in December after the final harvest calculation (milled grain). Farmers take responsibility for transporting the family allowance to their homes and for subsequent storage of that allowance. This system presents a number of problems for farmers, such as the practicality of physically transporting large quantities of rice to their homes, and access to mills. Household food security issues arise if a family cannot manage their grain supply. Such circumstances result in grain shortfalls in the months prior to the next harvest. Farms in South Hwanghae store rice in a central location and distribute to the farmers on a monthly basis.

Prior and ongoing assistance

Italian Trust Fund - SPFS Phase II project – This phase of the SPFS project includes post harvest activities. The project involves 3 demonstration farms in North Phyongan, and Kangwon Provinces and in Pyongyang. The project has provided some post harvest equipment such as rice combines, and rice milling equipment. The possibility of project extension is currently under consideration.

Swiss Agency for Development and Cooperation - Harvesting and Post harvest Treatment Project - This project focuses on farms in the Northern Provinces. The project aims, *inter alia*, to provide sustainable harvest and post harvest solutions based on appropriate technology interventions. While both the above projects achieved some success in sensitizing farm cooperatives and decision makers to issues and options related to post-harvest losses, their focus was primarily on agricultural production. The project will now change its orientation to specifically target the reduction of post-harvest losses.

European Union for Food Security Program- EUPS unit 3: The European Union funded urban food processing programs and has provided support to development of noodle manufacture, with the procurement of maize pulverizers, embryo separators and flour mills. The project runs from 2009 to 2012.

II. Strategy

PH losses have visibly reduced productivity levels. Focus is therefore going to be placed on strategic and cost effective interventions. Given the limited availability of total resources to address post-harvest problems, priority must be given to minimizing those losses that are important and which can be reduced in a cost-effective manner. Such prioritization will be constrained by a lack of reliable data on losses. However, based on the information available and from interviews with farmers and government officials, it is evident that efforts to reduce losses should be prioritized as follows:

(i) build capacity in post harvest technology and post-harvest management at the cooperative farm levels to reduce losses;
(ii) reduce the time from harvest to storage, and particularly the time for which paddy is left in the field following harvest. This can be achieved by reducing the quantity of material removed from the field and introducing small scale mechanization to enhance the efficiency of post harvest activities and substantially reduce post harvest losses;;
(iii) improve threshing technology and maize shelling for loss reduction
(iv) introduce the centralized storage of rice and the distribution of farmer's allocations on a monthly basis;
(v) improve storage facilities and equipment for reducing losses and boosting productivity;

(vi) introduce fuel efficient dryers designed to improve drying of the first harvest crops and maize; and

(vii) increase awareness of links between post-harvest losses and productivity level.

The main objective of the project is to enhance capacity at farm level in post harvest management through training of farmers, introduction and promotion of improved post harvest technology and management interventions to a wider audience, and awareness raising activities for farmers.

Capacity building will be targeted at both extension technicians and cooperative farm levels to facilitate future replication of the concepts and techniques. A pool of master trainers will be trained allowing them to train county level officers, who will in-turn train farmers. The detailed training package is outlined in Appendix 2. Capacity building of master trainers will involve three approaches: formal training, involvement in assessment studies and participation in study tours. Budgetary provisions have been made for the procurement of equipment to be piloted on demonstration farms. The design of the demonstration units is based on analysis of the current constraints, proposed improvements, associated capital and operational costs, and the potential benefits. This selection of technologies is considered indicative only, and may require reassessment during the implementation phase to more accurately reflect the needs of farmers in specific localities.

Management and Technology intervention packages are described in Appendix I and will be implemented on six demonstration farms. Technological packages have been designed to demonstrate the improvements possible through the adoption of appropriate technology and management practices. The selection of these technological options will incorporate consideration for energy constraints in rural areas. To this end, the project will liaise with the ongoing UNDP Project for Sustainable Rural Energy Development (SRED).

Prior to implementation, assessment studies (Appendix II) will be conducted as a basis for providing information which can be used to modify the design and management of each demonstration farm. These studies will also provide baseline data against which subsequent improvements will be measured.

Experience has shown that technology improvement alone will not bring about the expected outcome. Any solution to reducing post harvest losses will rely on the awareness and understanding of farmers of the concept of post harvest loss and on a comprehension of how and where such losses occur. However, as described, farmers do not seem to be aware of the magnitude of post harvest losses or of the management options available to reduce such losses. Awareness will be created before farmers are expected to fully participate in training at the demonstration sites. Awareness raising will provide the basis for an improved understanding of the different options available to the farmer to reduce post harvest losses.

The overall implementation strategy will emphasize participatory approaches. The project will include an 'action-research' function, whereby farmers will be actively involved in the development of post-harvest packages. The 6 selected farms represent different farming conditions and scales of operation, providing the opportunity for a comparative study. Beneficiary selection was predicated on the relevant policy and strategy of the sector that has been developed by the government, consultation between government and UNDP in the early days of project identification and findings of assessment done by government/the key stakeholder institutions. The demonstration sites will serve as sites for experimentation and observation by the farmers. Different designs and brands of equipment will be introduced on each farm, thereby maximizing the opportunity to compare available technological options.

The performance of demonstration farms will be carefully monitored by county officials who will be responsible for reporting results to the Ministry of Agriculture and the PHMPU (described in Part V - Management Arrangements). Based on these field results, adjustments will be proposed, implemented and

again tested. The demonstration packages will thus be further elaborated during implementation so that, towards the end of the program, firm statements can be made with regard to the viability of the tested technologies and management practices and their suitability in different environments.

Periodic assessments of the levels of crop loss on the demonstration farms will be built into a parallel UNDP project "Strengthening Capacity for the Improvement of Food and Agriculture Information System (Agricultural Databank)" that will be implemented concurrently with the current project. This project will provide inputs on baseline information and will monitor post harvest loss on the demonstration and neighboring farms.

Experience has shown that the maintenance of equipment can pose a serious limitation to project success. In order to mitigate this constraint, the budget provides for the purchase of spare parts for all of the equipment. Training of engineers in the maintenance and repair of the equipment will be provided. Maintenance log sheets and maintenance procedures will be developed for all operations.

Toward the end of the project, key findings and recommendations on reducing post harvest loss on farms in DPRK will be compiled and published in the form of extension materials which will be made available to county officers and cooperative farms. Appropriate policy proposals will be tabled for government consideration.

Many external assistance programmes are incorporating lessons learned in earlier interventions and in the process of shifting towards a more "development-oriented" approach and away from relief, rehabilitation responses Such programmes supports the agricultural production/sector, improving food security for vulnerable groups, and have an environmental dimension on issues impacting on the agricultural sector such as deforestation, erosion and watershed management. External assistance strategies are directed toward community-based approaches, introducing innovative resource-efficient technologies on farms, environmental protection, diversification of crops and crop systems, post-harvest losses and processing, integrating with sustainable employment and household income diversification, and recovery and resilience strategies against natural disasters and economic hardship. More detailed analysis of lessons learned and best practices will be incorporated at the Inception Stage of the project.

To reinforce sustainability of the project at its conclusion, the project will have an in-built sustainability strategy involving continual skills and knowledge transfer during project implementation. A sustainability strategy and plan will also be present at the inception, regularly updated and incorporated into its final report. The project will throughout the life of the project identify relevant stakeholders and individuals and put in place and describe a system of incentives comprised of techniques, technologies, training modalities that ensures practices are adopted, behavioral change enduring, and knowledge products and services effectively disseminated and shared. These will form part of the project exit strategy.

III. Results and Resources Framework

Project title and ID (ATLAS Award ID): Reduction of Post harvest Loss for Food Security

Intended Outcome as stated in the Country Programme Document 2011-2015:

Increased capacity to assess and monitor national food security situation, and to address post- harvest losses for improving food security.

Intended Output as stated in the Country Programme document:

Pre- and post-harvest losses reduced through introduction of efficient systems and methods (technological) and disseminating food and agriculture information and applying recommended measures

Outcome indicators

Baseline: High post harvest losses for all major grain crops.

Targets

- A core team of five master trainers trained in the post harvest handling of grains.
- Six assessment reports that provide information on the status of post harvest in the Democratic People's Republic of Korea.
- Four county post harvest teams trained in post harvest handling of grains, and equipped with training skills.
- One hundred key farmers on five farms trained in post harvest handling of grains.
- Six demonstration farms established, each capable of reducing current post harvest losses by at least 50 percent (crop saving of 10 percent)
- Recommendations and polices for reducing post harvest loss in the Democratic People's Republic of Korea.
- County officials and farmer extension material detailing methods and techniques for reducing on-farm post harvest loss published and disseminated.

With the critical food deficit situation in the Democratic People's Republic of Korea and the need to improve food security in the country, the project will support these objectives by reducing quantitative and qualitative post harvest losses through improved technological and management intervention and targeted capacity building at National, county and farm levels.

Applicable Key Result Area (from 2008-11 Strategic Plan): UNDP assists countries in formulating, implementing and monitoring national development strategies based on internationally agreed development goals, including the MDGs.

Partnership Strategy:

In line with its mandate to support capacity building in developing national effectiveness in enterprise resource planning, UNDP will provide the financing required to obtain the external inputs for the implementation of the project. The Government of the Democratic People's Republic of Korea will make available

other inputs including buildings and essential facilities for operational purposes and the professional and technical staff to support training efforts and to establish and monitor demonstration farms. FAO will have overall responsibility for project implementation and backstopping, with MoA as the implementing partner. UNDP/the Democratic People's Republic of Korea will monitor the project and provide administrative support to FAO.

Project title and ID (ATLAS Award ID): Reduction Post Harvest Loss for Food Security

INTENDED OUTPUTS	OUTPUT TARGETS FOR Project Year (PY)	INDICATIVE ACTIVITIES	RESPONSIBLE PARTIES	INPUT
Output 1[3]**:** Project management system established and agreed to; national project counterparts trained in project scope and post harvest technologies management. ***Baseline:*** *No project Management in place or counterparts mobilized;* ***Indicator:*** *Work plans, staff and counterparts in place, Master trainers trained and study tours implemented* ***Target:*** Project management *established by 2nd QTR.* -	◆ Operational Post harvest Management Project Unit (PHMPU) (PY 1) ◆ All project staff have received background training in post harvest handling and management (PY1) ◆ Detailed project work plans and assignment of responsibilities (PY1) ◆ Training manual and reference guide available for master trainers, county trainers and all project personal	• Work plans established • Proper coordination of project activities • Monitoring initiated • Project staff training implemented • Project aims and objectives defined and a detailed implementation plan developed • Project work-plans developed • Draft post harvest manual, reference material and farmer training guides published • Training on post management and techniques for cereals and grains	FAO, UNDP and MoA	***-Personnel(International)*** ◆ Chief Technical Advisor: USD 354 500 ◆ Agricultural Engineering Expert: USD 49 300 ◆ UNDP Procurement Officer: USD 54 400 ◆ UNDP UNV IT Specialist: ◆ USD 24 000 ***- Personnel(National)*** ◆ Consultant-Equipment maintenance: USD 3 200 ◆ 2 Consultants-Rice post harvest handling : USD 6 400 ◆ 2 Consultants-Maize post harvest handling: USD 6 400 ◆ Consultant-Wheat post harvest

[3] This output is both about putting management outfit in place and developing the first corps of training plans.

	◆ Master trainers fully trained in key projects areas (PY1) ◆ Master trainers and other personnel acquire knowledge during study tours and apply this knowledge toward further project development (PY1) ◆ Detailed knowledge of losses, on-farm logistics, and on-farm storage. (PY1)	implemented • Training in on-farm logistics and transportation implemented • Training on agricultural engineering design and construction storage facilities and drying technology implemented • Study tour or local training on rice and maize post harvest techniques implemented • Study tour or local training on drying techniques implemented • Study tour or local training on equipment design and maintenance implemented • Study tour or local training on equipment design and maintenance implemented • Seminar conducted after each study tour to present findings • Base-line study on post harvest losses on the demonstration farms • Study on on-farm logistics at the demonstration farms		handling: USD 3 200 ◆ Consultant-Drying technology: USD 1 600 ◆ Project Driver :USD 7 200 ◆ National M&E officer: USD 3 200 ◆ UNDP National Admin Assistant: USD 3 200 ***- Travel*** ◆ International Travel : USD 22 700 ◆ In country Travel: USD 17 000 ***- General Operating Expenditure*** ◆ Sundry: USD 7 000 ◆ Rental and Maintenance-Premises: USD 5 000 ◆ FAO Project Support Cost (equipment 7 percent, other budget 10 percent): USD 137 554 ***- In- Country Training*** ◆ Workshops: USD 12 879 ◆ Training-Master Trainers: USD 1 251 ***- Overseas Study Tours*** ◆ International training: USD 81 000

		implemented • Assessment of on-farm storage at farms in the counties participating in the project, conducted.		- ***Assessment Studies*** ◆ *Assessment of on-farm* post harvest losses: USD 5 000 ◆ Assessment of on-farm storage: USD 5 000 ◆ Assessment of on-farm logistics: USD 5 000 ◆ Assessment of post harvest loss through distribution system USD 5 000 - ***Equipment*** ◆ FAO Office equipment and Vehicle: USD 23 150 ◆ UNDP Office equipment: USD 1 500
Output 2: Technologies introduced, tested, demonstrated and optimized. ***Baseline:*** *Antiquated and inefficient post-harvest equipment used* ***Indicators:*** *New technology introduced*	◆ New machinery with simple associated working instructions and maintenance procedures and logs available for the demonstration farm(PY1) ◆ Farm post-harvest management practices optimized(PY1)	• New equipment purchased, tested and techniques for use developed • Work procedures drafted • On-farm logistics plans developed for each of the demonstration farms • Techniques and conditions for sun drying paddy optimized	FAO, UNDP and MoA	***-Personnel(International)*** ◆ Post Harvest Expert: USD 59 100 - ***Equipment*** ◆ FAO Project equipment: USD 618 500 ***- Contractual Services*** ◆ FAO Contractual Services: USD 110 000

Output3: Capacities developed in good post harvest practice and in the management, maintenance and repair of equipment, Capacities developed in loss assessment ***Baseline:*** *Limited knowledge base on good post-harvest practice and on the management, maintenance and repair of equipment* ***Indicators:*** *Existence of trained cooperative staff and technicians* 3.1 Training capacity of 3 officers in 4 counties (total 12 persons) improved. 3.2 Twenty farmers on six farms (total 120) fully trained in post harvest techniques 3.3 Methodologies for reducing quantitative and qualitative losses and reducing labour input demonstrated at six demonstration farms	• New improved support structures in use(PY2) • County level staff fully trained in the key project areas(PY2-PY3) • County staff familiarised with new management and technology practices (PY2-PY3) • Farmers and work team supervisors have increased awareness of post harvest problems and issues and are fully trained in key post harvest techniques (PY2-PY3) • A larger number of farmers within the demonstration farms, and neighbouring farms aware of strategies for reducing post harvest losses (PY2-PY3) • Four farms demonstrating	• A natural drying facility (400 sq. M) and a storage facility constructed A natural drying facility (400 sq. meter) constructed A central rice store (100 ton capacity) constructed • Training on post harvest practices, and hygienic management in post-harvest handling implemented • Training on management and familiarization with technology implemented. • Training on equipment maintenance and repair implemented. • Field school to demonstrate the use and maintenance of new equipment implemented. • On-farm logistics plans developed • Post harvest awareness training of farmers (120 participants) implemented • Farmer training on pre-harvest implemented	FAO, UNDP and MoA	◆ FAO Technical backstopping: USD 35 600 ◆ FAO Backstopping Missions: USD 12 200 ***- Drying Facility*** ◆ Contractual Services- Construction: USD 30 000 ***- In- Country Training*** ◆ Training-country level: USD 7 608 ◆ Training-farm level: USD 77 544 ◆ In-Country Study Tour: USD 2 500

3.3 Strengthen counterpart capacity to implement selected project components	improved, sustainable post harvest technology and management systems for rice • On farm demonstrations; improved, sustainable postharvest technologies and management practices applied for wheat (PY2-PY3) • Project counterparts implement good post-harvest practice	(120 participants) • Farmer training on handling of crops in the field (120 participants) implemented • Farmer training on threshing/shelling techniques (120 participants) implemented • Farmer training on good practice in transporting crops (120 participants) implemented. • Farmer training on drying techniques (120 participants) implemented. • Farmer training on pest infestation and pest control (120 participants) implemented. • Farmer training on milling implemented • Workshop at the farm level to discuss and evaluate the outcome of the new post harvest technologies and practices implemented • At least two open days held on each farm every year, for members of neighboring cooperatives farms		

		• Study tour or local training to review of all the demonstration farms implemented • New equipment and work procedures validated • Logistics plans validated for each farm • Management and Technology Package # 1 implemented at Jangsuwon and Soho Farms; Management and Technology Package #2 implemented at Mundok county, South Pyongan Province • Work practices monitored and post harvest losses assessed • New equipment and work procedures implemented • The logistics plan is tested • Management and Technology Package # 3 is tested at Pyonggam Farm, Koksan County, North Hwanghae Province • Work practices are monitored and post harvest losses assessed		

		Capacity gaps identified and addressed A training plan developed and implemented		
				Project Total: USD 1 798 686

IV. 2011 Annual Work Plan

EXPECTED OUTPUTS *And baseline, indicators including annual targets*	PLANNED ACTIVITIES *List activity results and associated actions*	TIMEFRAME				RESPONSIBLE PARTY	PLANNED BUDGET		
		Q1	Q2	Q3	Q4		Funding Source	Budget Description	Amount (USD)
Output 1[4] Project management system established and agreed to; national project counterparts trained on post harvest, and project scope ***Baseline:*** *No Project management in place* ***Indicators:*** *Availability of approved project document* ***Targets:*** *Project management system established an project counterparts trained* ***Related CP outcome:*** *Increased access of people to diversified range of foods as well*	1.1 Operational Post harvest Management Project Unit (PHMPU) established; all project staff have received background training in post harvest; Detailed project work plans developed with assigned responsibilities; Training manual and reference guide for master trainers, county trainers and all project personal developed								
		X				FAO	UNDP	71200-International Consultant - Agricultural Engineering Expert	49 300
		X				FAO	UNDP	71200-International Consultant - Post Harvest Expert	59 100
		X				UNDP	UNDP	61300-International Consultant UNDP Procurement Officer	54 400
						UNDP	UNDP	71500- UNDP UNV IT Specialist	24 000
						FAO	UNDP	71300-National Consultant (Equipment Maintenance)	3 200
						FAO	UNDP	71300- National Consultants (2 persons, rice post harvest handling)	6 400
						FAO	UNDP	71300-National Consultants (2 persons, Maize post harvest handling	6 400
						FAO	UNDP	71300-Consultant-Wheat post harvest handling	3 200
						FAO	UNDP	71300-Consultant-Drying technology	1 600
						FAO	UNDP	71300-National M&E officer	3 200

[4] Outputs stated here as first order of business.

as farmers increasing agriculture diversification and productivity						UNDP	UNDP	71300-UNDP National Admin Assistant	3 200
		X	X	X	X	FAO	UNDP	75100-FAO Project Support Cost (equipment 7 percent , other budget 10 percent)	45 962
						FAO	UNDP	72200-Equipment -Office equipment and Vehicle	23,150
						UNDP	UNDP	72200-Equipment - laptop	1,500
	1.1.1 Establish work plans	X							
	1.1.2Coordinate project activities		X						
	1.1.3 Project monitoring.		X			UNDP/FAO	UNDP	71600- In Country Travel	6,000
	1.1.4 Project staff training		X			FAO	UNDP	71600-International Travel	7,000
	1.1.5 Discuss and elaborate project aims, objectives and define a detailed implementation plan		X						
	1.1.6 Project work-plans developed, Draft post harvest manual, reference material and farmer training guides developed		X			FAO	UNDP	74500- Sundry	7,000
						FAO	UNDP	73100- Rental & Maintenance-Premises	5,000
	1.2 Master trainers fully trained in key project areas. Master trainers and other personnel apply knowledge acquired during study tours to further develop the project; the local knowledge base on of post harvest losses, on-farm logistics, and on-farm storage is improved as a result of training.								
	1.2.1 Training in on-farm logistics			X		FAO	UNDP	75700 In Country Training for Masters	405
	1.2.2 Training in agricultural engineering design and construction			X		FAO	UNDP	75700 In Country Training for Masters	405
	1.2.3 Study tour or local training on drying techniques			X		FAO	UNDP	75700 International training	27,000

	1.2.4 Study tour or local training on equipment design and maintenance			X		FAO	UNDP	72100- Contractual Services- Assessment Studies	10,000
	1.2.5 Seminars to disseminate information gathered during study tours				X	FAO			
	1.2.6 Baseline study on post harvest losses at the demonstration farms		X			FAO			
	1.2.7 Study of on-farm logistics at the demonstration farms		X			FAO			
	1.2.8 Assessment of on-farm storage at farms in the counties participating in the project		X			FAO			
Output 2: New technologies introduced, tested, demonstrated and optimized ***Baseline:*** *Antiquated and inefficient post-harvest equipment used* ***Indicators:*** *New technology introduced* ***Targets:*** ***Related CP outcome:***	2. New equipment with simple associated work instructions and maintenance procedures and logs available for the demonstration farm; Farm postharvest management practices optimized; new improved support structures built and put to use								
	2.1 Maize Storage and Drying facilities constructed and threshing centres paved	X	X			FAO	UNDP	72100-Contractual Services construction	110 000
	2.2 New equipment purchased and tested and instructions for use developed		X	X		FAO	UNDP	72200-Equipment -FAO Project equipment	226 000
	2.3 Work procedures drafted				X	FAO	UNDP	72100-Contractual Services- FAO Technical backstopping	12 000
	2.4 On-farm logistics plans developed for each of the demonstration farms				X	FAO	UNDP	72100-Contractual Services- FAO Backstopping Missions	4 000
	2.5 Techniques for sun drying of paddy optimized				X				
	2.6 An on-farm logistics plan developed for each of the demonstration farms				X				
Project Total									**699 422**

V. Management Arrangements

Execution Arrangements

The project will be executed by FAO. Project implementation will be undertaken in accordance with Agency Execution guidelines. It is however expected that the UNDP Resident Representative and the National Project Director (NPD) will endeavour to gradually transfer responsibility and accountability to the Government upon completion of the project.

A Project Board (PB)with representation from the Government of the Democratic People's Republic of Korea, the UNDP, and the various national stakeholders, will be responsible for overseeing and advising on the execution of the project and will be chaired by UNDP/the Democratic People's Republic of Korea. In line with corporate policy, the PSC will transition into (or its functions taken over by a Project Board during the CPD period (see below for CPD and Project Board)

As Executing Agency, FAO has the overall responsibility for project implementation. FAO will execute the project in close co-operation with UNDP and other relevant agencies of the Government of the Democratic People's Republic of Korea and will be responsible for timely implementation of project activities.

Procurement

For the implementation of procurement aspect of the project and bearing in mind the special regime under which the UNDP country office has to operate vis-à-vis assets acquisition and maintenance the following shall apply:

The executing agency (FAO) is expected to follow its own rules and regulations for its procurement activities under this project and shall ensure that procurement risks are mitigated.

In particular, the executing agency shall pay special attention to the following specific requirements for export licensing.

The executing agency should ensure that its contractors must comply with all laws, ordinances, rules and regulations bearing upon the performance of its obligations under the terms of its contract and must obtain at its own expense any necessary export licenses for the machinery, equipment and supplies procured by the agency and machinery, equipment, and supplies used for civil works under the project.

The executing agency should provide the selected contractors with all necessary information in order for the contractors to make export license application in a timely manner.

The executing agency should obtain from the contractors all licensing conditions attached the item and strictly follow the licensing conditions.

The executing agency should maintain the list of procured items and their location.

The executing agency should advise UNDP any changes to the procurement plan in a timely manner.

Government's Obligations

The Government of the Democratic People's Republic of Korea shall ensure the smooth implementation of the project, allowing unhindered access to project sites and timely issuance of visas for persons visiting under the project.

The project implementation will also be coordinated with the Government of the Democratic People's Republic of Korea through the National Coordinating Committee (NCC), which will provide guidance on policy matters, strategic priorities of the Government and appropriate supporting measures.

The project CTA will be responsible for day-to-day project management, timely field implementation of project outputs and activities, coordination of Individual consultants and their specific assigned tasks, under the overall guidance of FAO.

The Programme will be executed in close coordination with relevant government partners, who will provide the technical and operational support to the Programme, and liaise with the authorities and stakeholders in the target provinces, counties and farm cooperatives. These government partners will consist of, but not limited to, the following government ministries:

- Ministry of Agriculture;
- State Academy of Sciences and its relevant institutes/centres.

The representatives of the above national stakeholders, together with the Project personnel consisting of the Chief Technical Adviser, the National Project Director and the National Technical Coordinator will comprise the Project Steering Committee (PSC). The PSC will meet every six months to discuss and decide on technical issues of the Programme. Specifically, the function of the PSC is to:

- provide technical and operational guidance to the Programme;
- review the monthly execution plan for the activities of the Programme;
- monitor and evaluate the progress of the activities;
- discuss and address technical issues arising during the Programme implementation; and
- provide technical inputs into the work plan.

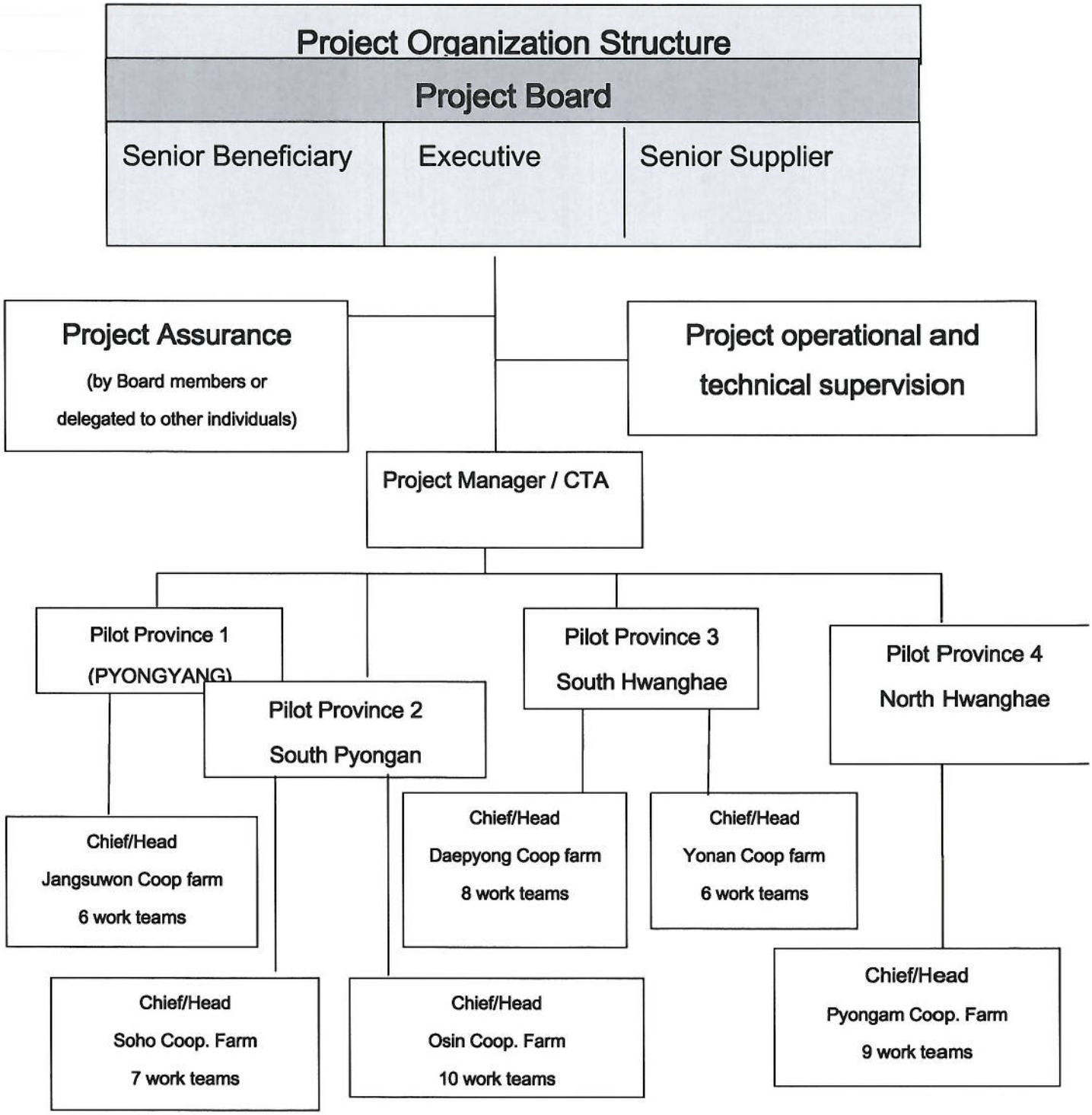
Reduction of post harvest losses is a project of the programme of food security and rural development of the country programme (CPD). It is belongs to the food security outcome. In line with corporate policy and practice, Project Boards will be established for each programme cum outcome during the CPD implementation. Thus, the Project Board for this programme will take over the functions of the PSC when it comes into being. The functions of the Project Board will extend beyond those of the PSC and will include:

The Project Board will meet every six (6) months (or as shall be determined by the body) and shall comprise of the following members:

- A representative from UNDP-the Democratic People's Republic of Korea, who shall be the Co-Chairman of the Project Board;
- A representative from NCC, who shall be the Co-Chairman of the Project Board;
- A representative from FAO and each Implementing Partner;
- The Chief Technical Adviser who shall act as the Project Board Secretary;
- The National Project Director.

Before coming into force of the CPD and establishment of the Project Boards, the project will be overseen by a PSC.

The following diagram shows the above implementation and reporting arrangements and the organizational structure as follows;


Project Organization Structure
Project Board
Senior Beneficiary
Executive
Senior Supplier
Project Assurance
(by Board members or
delegated to other individuals)
Project operational and
technical supervision
Project Manager / CTA
Pilot Province 1
(PYONGYANG)
Pilot Province 2
South Pyongan
Pilot Province 3
South Hwanghae
Pilot Province 4
North Hwanghae
Chief/Head
Jangsuwon Coop farm
6 work teams
Chief/Head
Daepyong Coop farm
8 work teams
Chief/Head
Yonan Coop farm
6 work teams
Chief/Head
Soho Coop. Farm
7 work teams
Chief/Head
Osin Coop. Farm
10 work teams
Chief/Head
Pyongam Coop. Farm
9 work teams

VI. Monitoring Framework and Evaluation

The following Monitoring and Evaluation activities are an integral part of the broader programme monitoring and evaluation arrangements established by UNDP that include provisions stipulated in Executive Board Decision 2009/1, which states that "UNDP will have unhindered access to project sites, as necessary for the implementation, monitoring and oversight of its programmes. UNDP will verify delivery of all equipment to project sites and will ensure that international personnel conduct an annual physical verification of project equipment against inventories".

M&E Activities	Frequency /Timing	Aspects to be Monitored & Evaluated/ Description	In-charge of Activity	Approval
Detailed Quarterly Workplan	Beginning of every Quarter	Quarterly work plan produced with detailed activities, schedule, milestones, deliverables, manpower inputs for the next quarter	CTA	PROJECT BOARD
Annual Workplan and budget	Beginning of each year	AWP produced with detailed activities, budget, milestones, deliverables, manpower inputs for the next year	CTA, NPD	PROJECT BOARD
Quarterly Progress Report (by CTA and SPA)	Quarterly	Quarterly report produced detailing quarterly accomplishments, lessons learned/problems faced during the execution of the activities, remedial action taken and planned activities for the next quarter. As per the ICF location, utilization of select physical and other resources will be verified on a quarterly basis through specially designed M&E tools.	CTA, NPD SPA	PROJECT BOARD
Activate and Regularly Update of Activity, Issue and Risk Logs in Atlas	At opening of project in ATLAS	ATLAS M&E logs activated to Update output progress, activity performance (quality log) risks and issues LOGS in Atlas.	CTA, PSU, SPA	SPA, IP
Annual Progress Report	Annual (at end of Year)	Annual progress report produced for annual accomplishments; Expenses for the year completed; update of Project workplan; lessons learned, recommendations and suggestions for re-orientation of activities (if necessary). Annual progress report will also be used to verify appropriate use of physical and other resources.	CTA, NPD, IP	PROJECT BOARD, UNDP
Mid-Term evaluation (if	Once at midterm	MTR conducted and report produced that reviews strategy and accomplishments; Expenses for the period completed; update of Project work plan; lessons learned,	SPA	PROJECT BOARD

M&E Activities	Frequency /Timing	Aspects to be Monitored & Evaluated/ Description	In-charge of Activity	Approval
necessary)		recommendations and suggestions for re-orientation of activities (if necessary). Progress towards outputs will also be reported on.		
Mission reports	After each mission	Mission reports produced on relevant aspects of the mission (according to defined template). These missions could include Senior Programme Advisor and other CO staff for verification of location and use of physical and other resources	Individual experts	CTA, PROJECT BOARD
Other reports and deliverables	After each TA or subcontract	Reports and deliverables produced vis-à-vis the TOR of the TA. These reports will also include reports on field visits by programme staff. The reporting will be in such format as to comply with CO ICF reporting obligations[5].	Individual experts	CTA, PROJECT BOARD
PSC or Project Board meetings	Every three months (or agreed by the body)	Reports and/or minutes of Project Board/Project Board meetings on project progress towards outputs; existing and/or emerging issues and risks; approve work plans and reports; provide policy guidance on implementation; budget and analysis of expenditure;	CTA; SPA	PROJECT BOARD, UNDP
Financial recording and reporting	Throughout the Project; continuous	Regular financial reports produced on monitoring and control of project expenditures; financial management & reporting; Project resource data tracking inputted in and regularly accessed from, the Atlas system	CTA;SPA	UNDP
Terminal Report	End of Project	Terminal report produced on project accomplishments especially as regards output achievement; Project expenses and financial report; Records and evidences of all outputs; verification of the existence/location of physical assets and their utilization; Lessons learned and recommendations for future actions	SPA	PROJECT BOARD, UNDP
Project Evaluation	End of Project	Project evaluation report produced on accomplishments vis-à-vis targets set out in the project document and identification of areas of comparative advantage for follow-up	SPA	PROJECT BOARD

[5] A special M&E format developed; use of this guideline/format to be agreed with CTA

Quality Management for Project Activity Results

OUTPUT 1: Project management system established and agreed to; national project counterparts trained on post harvest, and project scope		
Activity Result (ATLAS Activity ID)	**Project Management established**	**Start Date: March 2011** **End Date: June 2011**
Purpose	**To establish project management established and partnership modalities determined** **Capacity Building of staff to reduce post-harvest losses**	
Description	**A Technical Working Group (TWG) will be established as a mechanism for Government inter-agency coordination, Master trainers trained in post harvest management**	
Quality Criteria	**Quality Method**	**Date of Assessment**
1.Postharvest management project unit (PHMPU) coordinate among Governments participating agencies	**A TWG for each activity established as required**	**In every TWG meeting**
2.Enhance capacity	**Identification of RPFS staff to serve workshop master trainers; Study tours in foreign countries; in-country group training, working out arrangements with International institutions, completion of study tours and in-country group training programs** **Assessments by the training institution**	**End of each activity**
OUTPUT 2 New technologies introduced, tested, demonstrated and optimized		
Activity Result (ATLAS Activity ID)	**Improvement in Technology**	**Start Date: August 2011** **End Date: February 2012**
Purpose	**introduce efficiency, reduce PH and increase productivity**	
Description	**Equipment will procured, installed and evaluated for conformance with procurement document**	

	specifications	
Quality Criteria	Quality Method	Date of Assessment
New equipment purchased, tested and techniques for use developed	Assessment by Post Harvest/Agricultural Engineering consultant	After the installation of the equipment and before the release of payment to the vendor
OUTPUT 3 Capacities developed in good post harvest practice and in the management, maintenance and repair of equipment, Capacities in loss assessment introduced and applied		
Activity Result (ATLAS Activity ID)	training of technicians in PH loss reduction	Start Date: August 2011 End Date: December 2013
Purpose	To build capacities for sustainable PHL reduction To establish demonstration farms for assessing post harvest losses and to select project components for implementation	
Description	County staff familiar with new management practices, new technology introduced and maintenance and repair of equipment, and Methods to reduce quantitative and qualitative losses in grains and to reduce labour inputs will be demonstrated and project components for implementation will be selected	
Quality Criteria	Quality Method	Date of Assessment
1.Farmers and work team supervisors have increased awareness of post harvest problems and issues and are fully trained in key post harvest techniques	Post harvest awareness building for farmers and workshops at farm level to discuss and evaluate the new post harvest technologies and practices introduced	After the Report is prepared
2. Appropriate assessment on post harvest losses	New technology and management interventions ready for implementation, work practices and post harvest losses will be monitored.	During monitoring and following report preparation

VII. Legal Context

This project document shall be the instrument referred to as such in Article 1 of the SBAA between the Government of the Democratic People's Republic of Korea and UNDP, signed on 8 November 1979.

Consistent with the Article III of the Standard Basic Assistance Agreement, the responsibility for the safety and security of the executing agency and its personnel and property, and of UNDP's property in the executing agency's custody, rests with the executing agency.

The executing agency shall:

- put in place an appropriate security plan and maintain the security plan, taking into account the security situation in the country where the project is being carried;
- assume all risks and liabilities related to the executing agency's security, and the full implementation of the security plan.

UNDP reserves the right to verify whether such a plan is in place, and to suggest modifications to the plan when necessary. Failure to maintain and implement an appropriate security plan as required hereunder shall be deemed a breach of this agreement.

The executing agency agrees to undertake all reasonable efforts to ensure that none of the UNDP funds received pursuant to the Project Document are used to provide support to individuals or entities associated with terrorism and that the recipients of any amounts provided by UNDP hereunder do not appear on the list maintained by the Security Council Committee established pursuant to resolution 1267 (1999). The list can be accessed via http://www.un.org/Docs/sc/committees/1267/1267ListEng.htm

The project shall be executed in line with the rules and regulations of UNDP.

Annex 1 **Risk Analysis**

No.	Description	Date Identified	Type	Impact & Probability	Countermeasures /Mngt. response	Owner	Submitted, updated by	Last Update	Status
1.	Labor market yet to conform to international standards	July 2010	operational	Narrow HR market could affect quality of project support; P= 1 I = slow project implementation	NCC, TWG and UNDP working with national government to ensure facilitation;	FAO, UNDP, NCC	UNDP	N/A	N/A
2	Non Compliance with procurement rules and operating within a special ICF	July 2010	Organizational/Operational	technical nature of equipment list makes procurement process complex P=2 I=3 : delay in acquiring and installing equipment	Adherence to procurement rules and processes;	FAO, UNDP, MoA	UNDP	N/A	N/A
3	Approvals for M&E visits and access to project sites	July 2010	Operational	P 1. Unhindered and unfettered access to project sites at short notice is needed. Approval process may delay restrict this.	CO, UNDP maintaining close contact and work relations	FAO, UNDP, NCC	UNDP	N/A	N/A
4	Translation requirement of forms, reports, questionnaire etc	January 2010	Managerial	P2: translation requirements in terms of time and material input could delay progress of implementation	Proactiveness on part of EA, NPD and PM	FAO/NPD	UNDP	N/A	N/A
5	Unfavourable weather	July 2010	Environmental	Harsh/ unfavourable weather has potential to delay implementation and M&E P=2, I=3	Good planning of implementation activities to the extent practical and feasible	Project Manager/MOA	UNDP	N/A	N/A

[1] Environmental risks such as government not being able to meet its commitments i.e. fuel availability and/or electricity shortage are real. Climate changes can affect crop damage and harvesting failure.

Annex 2 Terms of Reference of International Experts

1. Chief Technical Advisor (CTA)[6] – Seed Technology and Post Harvest Management

Duty Station: Pyongyang, with travel within the country.

Duration: 36 months

Duties: Under the overall operational and technical supervision of FAO and guidance of Senior Programme Advisor/Head of Programmes UNDP, and in close collaboration with National Project Director, the CTA will perform the following:

- Liaise with relevant government ministries and departments, and with project staff, to ensure coordination and collaboration required for implementation of the project;
- Assume responsibility for day to day management of the project[7] implementation and for assuring achievement of project outputs;
- Organize the project inception and launch workshops, serve as a resource person and advise on project implementation strategies for each project;
- Prepare detailed project work-plans and work plans for individual staff, and guide their implementation;
- Prepare and submit an Inception Report;
- Supervise the overall implementation of the project;
- Review project documentation and meet all reporting requirements;
- Prepare in-country training modules in association with the NPD and the concerned project managers;
- In collaboration with FAO and the NPD identify institutions and countries for study tours and assist the NPD in submitting nominations of suitable candidates;
- Advise, assist and work closely with the PHMPU on all input supply activities including: preparation of technical specifications for equipment and materials; correspondence with various UNDP officers on procurement issues, delivery and distribution of inputs;
- Advise on the commissioning of equipment, finalize location, maintenance and use of equipment and arrange for Government inputs in coordination with NPD;
- Assist operators in the assembly of the various post harvest and agro-processing equipment, assembly, calibration, adjustment and operation;
- Advise, assist and technically supervise and monitor in close collaboration with the National Project Director and project team, the technical inputs of the national consultants;
- Undertake frequent field visits and personally verify equipment location and use, the impact of training on the improvement in the skills of county officers and farmers, and assess work team development opportunities;

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[6] The CTA will manage both projects "Reduction of Post harvest Loss for Food Security" and "Improved Seed Production for Sustainable Agriculture". The post-harvest project and the Seed Project will finance the consultant for 18 work months each.

- Undertake frequent field visits and personally verify equipment location and use, the impact of training on the improvement in the skills of county officers and farmers, and assess work team development opportunities;
- Prepare a Project Progress Report in English, every six months. This report shall contain:
  - i) an account of actual implementation of the activities compared to that scheduled in the work-plan, and the achievement of outputs and progress towards achieving the project objectives, based on objectively verifiable indicators;
  - ii) an identification of any problems and constraints (technical, human, financial, etc.) encountered during implementation;
  - iii) recommendations for corrective measures;
  - iv) a detailed work-plan for the following reporting period.
- Partake in the Project Board meetings and prepare minutes of these meetings;
- Organize and participate the mid-term technical review and appraisal of the project;
- Meet all reporting obligations of the project for M&E purposes and meet M&E requirements of the project;
- Make recommendations on partnerships, networking and technical assistance and resource mobilization opportunities for project scaling up and replication;
- Prepare a draft Terminal Report - This report will assess in a concise manner, the extent to which the project's scheduled activities have been carried out, the outputs produced, the progress towards achievement of the Objectives, and will also present recommendations for any future follow-up action arising out of the project.

Specific tasks In addition to the duties detailed above the CTA will undertake the following specific duties:

- Prepare and deliver the agricultural engineering design training;
- Review the storage study report;
- Design the improved rice storage structures;
- Design a fuel efficient, low cost 12 flat bed dryer for drying maize;
- Design a fuel efficient, low cost 4 ton flat bed dryer for drying heat;
- Assist in the construction of the storage structures;
- Assist in the construction of the 12 ton flat bed dryer for maize;
- Assist in the construction of the 4 ton flat bed dryers for wheat;
- Assist in developing maintenance procedures and logs for the project equipment;
- Review related seed policy issues concerning seed ordinance, seed rules and seed policy. If necessary advise MOA to amend these instruments for better implementation of seed activities;
- Assist in preparation of training manuals on seed related subjects;
- Check the construction of all the project equipment; and
- Assist in commissioning and calibrating the flat bed dryers;
- Additional responsibility is to manage the project "Improved Seed Production for Sustainable Agriculture" according to its ToRs.

Qualifications: University degree in agricultural engineering or equivalent with at least 15 years field experience in post-harvest operations, preferably in Asia, with demonstrated practical knowledge and

understanding of grain post-harvest physiology and experience in the operation of seed development programmes. Fluent English language skills and familiarity with and ability to use modern office computing facilities are essential. The consultant should be familiar with participatory development approaches and have a sound project management experience, preferably with knowledge of post

2. International Post harvest Expert

Duty Station: Post Harvest Management Project Unit (PHMPU) in Pyongyang, with travel within the country and at home-base.

Duration: Three months of which two months will be spent in DPRK in two missions; one month home-based.

Duties: Under the technical supervision of FAO, in close consultation with the CTA, MoA, UNDP offices in Pyongyang, the international consultant will:

- Participate in the project launch workshop in the capacity of resource person and advise on project implementation strategies;
- Advise, assist and technically supervise and monitor in close collaboration with the CTA and project team, the technical inputs of the national consultants;
- Undertake field visits and personally verify the impact of training on the improvement in the skills of county officers and farmers, and assess work team development opportunities;
- For all missions subsequent to the project launch mission prepare a draft programme of work and draft TORs for each mission;
- Prepare reports at the end of each mission and in close consultation with PHMPU prepare the yearly progress report;
- After each mission, prepare a detailed end-of assignment report that elaborates findings and recommendations, progress towards achieving assignment objectives with conclusions and recommendations on further action needed for the expansion of the project interventions and future development needs.

Specific duties:

Missions 1 and 2 In addition to the duties detailed above the international post harvest expert will undertake the following specific duties:

- Prepare and deliver training on post harvest technologies to project staff;
- Prepare the draft post harvest training manual and technical reference material;
- Assist in the project planning and drafting of the detailed work plan;
- Provide training in the methodology for the assessment of post harvest losses;
- Prepare ToRs, background material and reporting forms for assessment studies of post harvest losses and on-farms logistics at the demonstration farms. Provide training on loss assessment methodologies;
- Participate in the baseline study for post-harvest loss assessment.

In addition to the duties detailed above, the international post harvest expert will undertake the following specific duties:

- Assist in the preparation of the study tour for rice post harvest handling and maize/wheat post harvest handling;
- Review study tour reports;
- Prepare and deliver a training programme to master trainers on technical aspects of post harvest, with a specific focus on safety and quality management in the post-harvest chain;
- Evaluate the results of the baseline survey of post-harvest losses study;
- Assist in developing work procedures for the equipment and techniques;
- Assist in the evaluation of current drying techniques and develop procedures to improve the processes;
- Assist in the development of farmer training guides and post harvest awareness material;
- Assist in establishing the monitoring protocols and procedures in liaison with the databank project;
- Review systems and work processes, adjust where necessary.

Qualifications: University degree in agriculture or food science with a minimum of 15 years work experience preferably in Asia. Working knowledge of English is essential. The consultant should be familiar with participatory development approaches and have sound project management experience.

3. <u>International Agricultural Engineering Expert</u>

Duty Station: Post Harvest Management Project Unit (PHPMU) in Pyongyang, with regular visits to the project sites and half-month home-based.

Duration: Two and one half months, two months in DPRK in two missions. Half a month home-based

Duties: Under the administrative guidance and supervision of UNDP offices in Pyongyang, and in close consultation with the PHMPU and relevant institutes and Farm Cooperatives, the consultant will undertake the following tasks:

- Design the improved rice storage structures;
- Design a dryer that makes use of natural drying facilities for maize drying;
- Design a dryer that makes use of natural drying facilities for drying wheat;
- Assist in the construction of the storage structures;
- Assist in the construction of natural drying facility for maize;
- Assist in the construction of natural drying facility for wheat;
- Prepare and deliver the agricultural engineering design training;
- Assist in developing maintenance procedures and logs for the project equipment;
- Review the storage study report;
- Check the construction of all the project equipment;
- Assist in commissioning and calibrating natural drying facility.
- Assist in implementing the activities outlined in the project document.

- Prepare a mission report following FAO guidelines giving findings, conclusions and recommendations for immediate implementation or future follow up, with specific ToRS developed for any future missions.

Specific missions

Mission 1: In addition to the duties detailed above the international agricultural engineering expert will undertake the following specific duties:

- Prepare a manual on appropriate agricultural methodologies and design;
- Evaluate the natural drying facility for each grain type;
- Prepare a document on the maintenance of agricultural machinery and safe working practices;

Mission 2: In addition to the duties detailed above the international agricultural engineering expert will undertake the following specific duties:

- Introduce the selection, testing and evaluation of agricultural machines and post harvest equipment;
- Introduce the storage facility to the rice farms;
- Introduce the improved storage plan for the maize farm.

Qualifications: Advanced degree in agriculture engineering or equivalent with demonstrated understanding of post-harvest principles. At least 10 years field experience and familiarity with farm construction, design, maintenance and repair. Fluent English language skills and familiarity with and ability to use modern office computing facilities are essential.

Appendix 1 Management and Technology Packages

Introduction

Provisions are made for the procurement of selected technologies, for the establishment and operation of demonstration farms. The design of the demonstration farms responds to the critical issues identified, the proposed improvement, associated capital and operational costs, together with the potential benefits. This selection is considered to be indicative only and, given the dynamics of development programmes, may require reassessment during the implementation phase to reflect the needs of specific farms. The demonstration farms have been developed to demonstrate the improvements possible through the adoption of appropriate technology and management practices.

The procurement of the following list of equipment will be subject to a joint FAO-UNDP assessment described under Part V - Management Arrangements.

Management and Technology Package No 1

Medium-scale: Complete mobile and combine threshing, transport, maize storage, rice milling and drying facility including cement pavement

1. Current Situation

At the proposed demonstration sites post harvest losses during combined operations is conservatively estimated as at least some 20 percent but, in instances, can be as high as 30 percent. Major causes of loss are the extended periods over which harvested paddy remains in the field, resulting in grain being eaten by birds or other pests; dropped grain; poor threshing resulting in further grain loss; grossly inadequate storage with more grain lost to pests and spillage. Qualitative losses result from spoilage prior to drying and microbial contamination. These problems result from antiquated and inefficient technology, inadequate labour/mechanization and inefficient management of post harvest processes. Transport of rice to the PDS is an inefficient process due to a lack of workable vehicles. Transport of rice by farmers to their household poses an additional bottleneck, tying-up much needed labour. Farmers take time to transport rice to their homes, hindered by the lack of transport and the quantity of rice that must be moved at one time.

Some farm households are unable to effectively manage their rice stores leading to grain shortfalls before the next harvest. It is important to consider an integrated system for undertaking these tasks to ensure safe storage conditions at optimum moisture content of 14 percent.

2. Proposed Improvement

The system proposed is designed to result in a 10 percent reduced post harvest loss or a saving of about 400 tons for the demonstration farms in this study. The concept of this package is based on reducing the weight and mass of material to be moved from the field by in-field threshing, use of small scale mechanization, use of a 4 wheel tractor (20hp) with hydraulic trailer (1ton) and improving centralized rice storage. The project approach aims at the use of small items of equipment thus justifying the use of a small diesel engine. Further, the use of small machines will make it easier to reproduce spare parts

or exchange equipment when one item breaks down. Threshing paddy in the field will bring about a 50 percent reduction in the weight of paddy to be moved to the threshing centre. Straw must be moved at a later date. The package will be supported by improved on-farm logistics and management of activities, such as paddy drying. The improved storage facility will be based on a flat shed/tank system.

3. Location

3.1 Jangsuwon Farm, Pyongyang (six grain production work teams)

3.2 Yonan Township Farm, South Hwanghae Province (six grain production work teams)

These two cooperative farms were originally proposed in the 2006-2009 project.

4. Capital cost:

Table 1 Capital cost for Jangsuwon Cooperative Farm, Daesong District, Pyongyang City (Package No. 1)

Description	Unit Price	2011	2012	2013	Total Cost (USD)
Combine(0.5ha/hour)	12 000	1	-	-	12 000
Mobile Thresher	4 250	1	-	1	8 500
Tarpaulin and plastic sheets	1 000	5	-	5	10 000
Unit set of 4 wheel tractor (20hp) with hydraulic trailer (1ton) and spares for 2 years	2 500	1	-	1	5 000
Storage bags, 40kg (jute, Polypropylene (unit 1000)	400	40	-	-	16 000
Drying Facility Construction & Threshing Centre Pavement	200 000	-	-	-	200 000
Maize storage (50 ton capacity)	20 000	1	-	-	20 000
Grain moisture meter	1 000	-	1	-	1 000
Truck for grain transport	15 000	1	-	-	15 000
Total cost (USD)					287 500

Table 2 Capital cost for Up Cooperative Farm, Yonan County, South Hwanghae Province (Package No. 1)

Description	Unit Price	2011	2012	2013	Total Cost (USD)
Combine(0.5ha/hour)	12 000	1	-	-	12 000
Mobile Thresher	4 250	1	-	1	8 500
Tarpaulin and plastic sheets	1 000	5		5	10 000
Unit set of 4 wheel tractor (20hp)with	2 500	1	-	1	5 000

hydraulic trailer (1ton) & spares for 2 years	400	40	-	-	16 000
Storage bags,40kg (jute, Polypropylene (unit 1000)	25 000	-	1	-	25 000
Rice Milling (2 ton/hr)	200 000	1	-	-	200 000
Drying Facility Construction and Threshing Centre Pavement	1 000	-	1	-	1 000
Grain moisture meter	15 000	1	-	-	15 000
Truck for grain transport					
Total cost (USD)					293 500

* Diesel engine trucks, specification of which will be prepared and clearance obtained from headquarters before procurement.

The proposed capital costs on equipment and machinery of these two cooperative farms were adjusted and updated based on their requirements.

5. Risks and Assumptions:

- Rice will be distributed on a monthly basis from a centralized storage unit;
- Operators will be trained in the operation and management of an integrated system;
- Each system will be implemented at the work team level;
- An average work team harvesting capacity of 10 ton/day;
- On-farm storage needs are based on a per person allowance of 260kg/year.

6. Observations:

- Two threshers per work team;
- Each farm will receive a different design/model of thresher;
- Two tractor-trailer sets per work team;
- Equipment specifications will be finalized at the time of implementation, based on the final configuration.

Management and Technology Package No. 2

Medium-scale: Complete mobile and combine threshing, transport, rice milling, drying facility including cement pavement

Current Situation

At the proposed demonstration sites level of post harvest losses during these combined operations is conservatively estimated to be of the order of 20 percent but, in some instances, as high as 30 percent. Major causes of loss are the extended periods over which harvested paddy remains in the field, resulting in grain being eaten by birds or other pests and dropped grain; poor threshing resulting in further grain loss and grossly inadequate storage with more grain lost to pests and spillage. Qualitative losses result from spoilage prior to drying and from microbial contamination. The problems result from old inefficient technology, lack of labour/mechanization and inefficient management of the post

harvest processes. Transport of rice to the PDS is an inefficient process due to the lack of workable lorries. Transport of rice by farmers to their household is an additional bottleneck, tying-up much needed labour. Farmers take time to transport rice to their homes, hindered by lack of transport and the quantity of rice that must be moved at one time.

Some farm households are not able to manage their rice stores effectively leading to grain shortfalls some months before the next harvest. It is important to consider an integrated system for undertaking these tasks to ensure safe storage conditions at optimum moisture content of 14 percent.

2. Proposed Improvement

The system proposed is designed to bring about a 10 percent reduction in post-harvest loss or a saving of about 700 tons for the two *demonstration farms* in this study. The concept of this package is based on reducing the weight and mass of material to be moved from the field by in-field threshing, using a 4 wheel tractor (20hp) with hydraulic trailer (1ton), the use of small scale mechanization and improving centralized rice storage

The project approach aims to make use of small equipment thus justifying a small diesel engine. Further, the use of small machines will make it easier to reproduce spare parts or exchange equipment when one item breaks down. Threshing paddy in the field will bring about a 50 percent reduction in the weight of paddy to be moved to the threshing centre. Straw will be moved at a later date.

The package will be supported by improved on-farm logistics and management of activities (i.e paddy drying).

The centralised improved storage facility will be based on the current system of storing rice in the farm yard, but will make use of weatherproof woven polypropylene bags in stacks, to be formed using conveyers at the central rice milling yard. The system will be resistant to birds, rodents and insect pests.

3. Location

3.1 Osin cooperative farm in South Poyngan Province (10 grain production work team)

3.2 Soho cooperative farm in South Pyongam Province (7 grain production work team).

These 2 cooperative farms are different from those originally proposed in the 2006-2009 project. Maejong farm was replaced by Osin farm since FAO has already provided equipment to Maejong farm. Ohyon farm was replaced by Soho farm since Ohyon farm is located in the same county as Yonon farm in South Hwahghae province.

4. Capital cost

Table 3 Capital cost for Osin Cooperative Farm, Daean District, Nampo City, South Poyngan Province(package no.2)

Description	Unit Price	2011	2012	2013	Total cost (USD)
Combine(0.5ha/hour)	12 000	1	-	-	12 000
Mobile Thresher	4 250	1	-		4 250
Tarpaulin and plastic sheets	1 000	10	-	10	20 000
Unit set of 4 wheel tractor (20hp) with hydraulic and trailer (1ton) & spares for 2 years	2 500	1	-	-	2 500
Drying facilities, including cement pavement (400 sq. metres)	15 000	1	-	-	15 000
Storage bags, 40kg (jute,	400	-	-	40	16 000
Polypropylene(unit 1000)	1 000	-			1 000
Grain moisture meter	15 000	1	1	-	15 000
Truck for grain transport	200 000	1	-	-	200 000
Drying Facility Construction and Threshing Centre Pavement			-	-	
Total cost (USD)					285 750

Table 4 Capital cost for Soho Cooperative Farm, Mundok County, South Pyongan Province (Package No. 2)

Description	Unit Price	2011	2012	2013	Total cost (USD)
Combine (0.5ha/hour)	12 000	1	-	-	12 000
Mobile Thresher, 2 ton/hr	4 250	1	-	1	8 500
Tarpaulin and plastic sheets	1 000	5	-	5	10 000
Unit set of 4 wheel tractor (20hp)with hydraulic trailer (1ton) and spares for 2 years	2 500	1		1	5 000
Storage bags, 40kg (jute,	400	40	-	-	16 000
Polypropylene (unit 1000)	25 000	-	1	-	25 000
Rice Milling, 2ton/hr	1 000		1	-	1 000
Grain moisture meter	15 000	1	-	-	15 000
Truck for grain transport	200 000	1			200 000
Drying Facility Construction and Threshing Centre Pavement					
Total price (USD)					292 500

* Diesel engine trucks, specification of which will be prepared and clearance obtained from headquarters before procurement.

The proposed capital costs on equipment and machinery of these two cooperative farms were adjusted and updated based on their requirements.

5. Risks and Assumptions

- Rice will be distributed on a monthly basis to farmers from a centralized on-farm grain store;
- Operators trained in the operation and management of an integrated system;
- Each system will be implemented at the work team level;
- Average work team harvesting capacity of 10 ton/day;
- On-farm storage needs are based on a per person allowance of 260kg/year.

6. Observations:

- Two threshers per work team;
- Each farm will receive a different design/model of thresher ;
- Two tractor-trailer sets per work team;
- Equipment specifications will be finalised at the time of implementation, based on the final configuration.

Management and Technology Package No. 3

Medium-scale: Mobile Threshing, Complete Maize Sheller and harvester, transport and drying facility including cement pavement

Current Situation:

The level of post-harvest losses during these combined operations is conservatively estimated as at least 20 percent but, can in instances be as high as 42 percent. Quantitative losses are attributable to delays in transporting maize from the field, shelling operations, and losses due to pests during storage. The extent to which losses occur during longer term storage can be as high as 25-30 percent of the total, given the easy access to rodents, birds, and insects. Current storage structures do not allow for drying and are used only for storage. Maize must, therefore, be dried prior to being stored. Drying is limited to about two days, owing to limited time availability before the rice harvest. Farmers report spoilage of cobs stored at the bottom of the stores owing to moisture condensation. Additional product handling is required as material must be moved from yard to store. The design of the store also negates an efficient storage structure. Design features of the stores are not conducive to protection from attack by rodents or birds. The stores are on the ground and are covered only by straw. Qualitative losses result from spoilage prior to drying and storage of inadequately dried maize. The safety of grains can also be compromised by aflatoxin production. In order to reduce the time for which maize is kept moist it is important to consider an integrated system for undertaking these tasks to ensure safe storage conditions at optimum moisture content of 13 percent.

Proposed Improvement

The system proposed is designed to result in a 10 percent reduction in post-harvest loss or a saving of 1 100 tons for the demonstration farm. The system will ensure that maize is dried within 24 hours after harvest. The concept is based on introducing small scale mechanization (two wheel tractor - 1 ton capacity trailer combination) to move harvested produce from the field to the threshing centre. Maize will be artificially dried using a flat bed dryer (12 tons/batch). The farm by-product (cob, rice husk) will

be used as a fuel source. A combined sheller/cleaner at a rated capacity of 3 ton/hour will also be used. Product will be bagged immediately after shelling, and stored in the traditional manner.

The package will be supported by improved on-farm logistics and management of activities. The operational criteria are based on incoming maize at 25 percent moisture content, and reduction to a safe storage moisture content of 13 percent A total maize yield per work team of about 500 ton and daily harvest of 25 tons (20 days for harvest) is projected.

3. Location:

Pyongam cooperative farm in North Hwanghae Province (14 work teams for grain production)

Sokjong farm was replaced by **Pyongam** farm from the original proposed project in 2006-2009, since Sokjong farm has already been provided with equipment from FAO.

Capital cost:

Table 5: Capital cost for Pyongam Cooperative Farm, Koksan County, North Hwanghae Province (Package 3)

Description	Unit Price	2011	2012	2013	Total Cost (USD)
Mobile Thresher	4 250	1	-	-	4 250
Unit set of 4 wheel tractor (20hp) with hydraulic trailer (1ton) and spares for 2 years	2 500	1	-	-	2 500
Storage bags, 40kg (jute, Polypropylene (unit 1000)	400	-	40	-	16 000
Maize Sheller	1 500	1	-	1	3 000
Maize harvester (cap 4 ha/day)	29 000	1	-	-	29 000
Grain moisture meter	1 000	1	-	-	1 000
Truck for grain transport	15 000	-	-	-	15 000
Drying Facility Construction and Threshing Centre Pavement	200 000	1	-	-	200 000
Total cost (USD)					270 750

* Diesel engine trucks, specification of which will be prepared and clearance obtained from headquarters before procurement.

The proposed capital costs on equipment and machinery of the cooperative farms was adjusted and updated based on their requirements.

5. Risks and Assumptions:

- Operator training received in the operation and management of an integrated system;
- Each system will be implemented at the work team level;
- The drying facility is 400 sq.metres in size;
- Harvest rate is 4 ha/day.

6. Observation:

The drying facility which is 400 sq. metres, was designed for cereals, rice, corn and wheat. It was developed under a European Union project.

Management and Technology Package No. 4

Small-scale: Mobile threshing, maize sheller, transport, drying facility including cement pavement and cement pavement for dry cereals

Current Situation

Post harvest losses during these combined operations are conservatively estimated to be at least 20 percent. Quantitative losses are attributable to delays in transporting wheat from the field as labour resources are diverted to planting the rice crop and lack of mechanization, inefficient threshing operations as the wheat is either not dried or incorrectly dried. The inclement weather during the harvest period is not suitable for natural drying of the crop. Wheat is often threshed without drying or at too high a moisture content.

Proposed Improvement

The system proposed is designed to result in a 10 percent reduction in post harvest loss or a saving of 40 ton for the demonstration farm The concept of this package is based on introducing small scale mechanization using mobile threshing, introduction of artificial drying 57size 400 sq. metres. The package will be supported by improved on-farm logistics and management of activities.

Location

Daepyong cooperative farm in North Hwanghae (eight grain production work team)

This cooperative farm was not included in the original project proposal.

4. Capital cost

Table 6: Capital cost for Daepyong Cooperative Farm, Singye County, North Hwanghae Province (Package No. 4)

Description	Unit Price	2011	2012	2013	Total cost (USD)
Mobile Thresher	4 250	1	-	1	8 500
Tarpaulin and plastic sheets	1 000	10	-	10	20 000
Unit set of 4 wheel tractor (20hp) with	2 500	1	-	1	5 000
hydraulic trailer (1ton) and spares for 2 years	400	-	40	-	16 000

Storage bags, 40kg (jute, Polypropylene unit 1000)	1 500	1	-	1	3 000
Maize shelter	1 000	-	1	-	1 000
Grain moisture meter	15 000	1	-	-	15 000
Truck for grain transport	200 000	1	-	-	200 000
Drying Facility Construction and Threshing Centre Pavement					
Total cost (USD)					268 500

* Diesel engine trucks, specification of which will be prepared and clearance obtained from headquarters before procurement.

The proposed capital costs on equipment and machinery of the cooperative farms was adjusted and updated based on their requirements.

5. Risks and Assumptions

- Daepyong Farm is also the demonstration site selected for improved rice and maize handling, hence mobile threshing and a maize sheller will be purchased;
- Operator training received in storage management;
- Each system will be implemented at the work team level.

6. Observations

A drying facility designed for cereals, rice, corn and wheat was developed under a European Union project with a size of 400 sq. metres.

7. Overall Budget for equipment

The procurement of the following list of equipment will be subject to a joint FAO- UNDP assessment described under Part V - Management Arrangements.

Table 7: Budget for all equipment

Item	Procuring Agency	Unit	Cost (USD)
Combine (0.5ha/hour)	FAO	4	48 000
Mobile Thresher	FAO	10	42 500
Unit set of 4 wheel tractor (20hp) and trailer (1ton) & spares for 2 years	FAO	10	25 000
Maize sheller	FAO	4	6 000
Maize harvester(cap.4ha/day)	FAO	1	29 000
Rice Milling, Cap. 2 ton/hr	FAO	2	50 000
Truck for grain transport (Diesel Engine, Cap. 10 ton)	FAO	6	90 000
Grain moisture meter	FAO	6	6 000
Vehicle-4 wheel drive	FAO	1	20 000
Non-expendable	FAO		156 000
Expendable(bags, tarpaulins and plastic sheets)	FAO		166 000
Desktop Computer Dell, CoreDUO, 3Ghz/320GB	FAO	1	800
Printing machine HP Laser jet	FAO	1	500
Laptop Computer Core, 2 DUO 2.5Ghz	UNDP	1	1 500
LCD Projector	FAO	1	1 500
Digital Camera 14Mega Pixels	FAO	1	350
Total			*643 150*

Appendix 2 Training Plan

A. TRAINING PLAN

Outlines of the training curriculum, preparation of training material and training arrangements will be prepared by the national team assisted by the CTA and other international and national consultants. Development of detailed training programmes and curricula will be the duty of the CTA, international consultants and master trainers, who apart from implementing formal training courses and workshops are expected to conduct on-the-job training in their disciplines with the cooperative farm staff of the project.

B. TRAINING PROGRAMS

Organization of Training Activities

Master trainers will implement training of county staff who would in turn train farmers. The master trainers will be technical staff of the Agricultural Academy of Science (AAS), who would be supported by resource persons from government line agencies and national consultants. The project would provide three levels of training during its lifetime: (i) training for master trainers; (ii) training for county staff; and (iii) training of farmers at work team level (WT). The master trainers will deliver training to county staff who will in turn train farmers on the demonstration farms of their respective counties. Typically work team training will be conducted on the cooperative farms and will focus on operational issues.

Master training programmes are envisaged in the areas of post harvest management and technology, agricultural engineering and on-farm logistics. It is anticipated that such training would be convened by the CTA and other International consultants. Formal training will be augmented by participation in assessment studies and study tours.

Project Inception Training

The first training program to be organized under the project will be an introductory training course which will include a one day project familiarization/planning workshop. This training program will incorporate the participation of all staff and concerned counterparts. Training will be developed and presented by the international post harvest expert. The objective will be to ensure that all project staff has a basic understanding of post harvest. It will discuss and elaborate the project's aims and objectives and will define a detailed implementation schedule and work plan, including targets and milestones. This program will have duration of 1 week.

During this training programme, the project implementation plan will be discussed and an operational plan approved. The training will also provide ideas to the PHMPU for development of the project implementation plan.

Master Training

It is expected that master trainers will be staff of the Academy of Agricultural Sciences. Master trainers will be provided different forms of training. Formal training will be augmented by participation in assessment studies (detailed later in this Section) and the study tours. In addition, the master trainers are also expected to participate during equipment testing and in activities at the demonstration farms.

1. In-Country Training

All formal training sessions will provide an opportunity to develop train the trainer skills in the context of the technical matter covered by the training.

Post harvest management and technology: Master trainers will attend a one week training course on Post Harvest Management and Technology which will be designed, organised and implemented by the international post harvest expert in collaboration with the national consultants in coordination with MoA. The training will cover the following:

- Harvesting, threshing, drying, milling and storage of main staple crops under local conditions;
- Available improved mechanization and post-harvest technology and suitability to local conditions, the problem of energy, animal draft;
- Practical field assessment of post-harvest losses, quality, safety and hygienic practices;
- Good management practice

Agricultural engineering methodologies: Master trainers, key personnel and those involved in the storage study will receive a five day course on appropriate agricultural engineering methodologies and design. The training will be developed, organized and delivered by the CTA. Training will make use of outputs from the storage capability study as cases and will demonstrate the design of improved facilities / equipment using local inputs.

The training will cover the following:

- agricultural engineering design;
- operational and maintenance of agricultural machinery and adoption of safe working practices;
- mechanical aids to agro-processing, their construction, use and maintenance;
- selection, testing and evaluation of agricultural machines and post-harvest equipment.

On-farm logistics: Masters Trainers, key personnel and those involved in the farm logistics study will be trained over five days on appropriate farm logistics methodologies. Training will be developed and delivered by the international on-farm logistics expert. Training will make use of outputs from the on-farm logistics study as cases and will demonstrate the design of improved logistics adapted to the local conditions.

2. Study Tour

The project will support study tours to review experiences and new concepts in technology and management practices. Suggested location for the study venue will be provided by the CTA assisted by the International consultants, for approval by the implementing agency:

- agricultural engineering design (post production equipment including storage and simple food processing) and equipment maintenance and repair - suppliers will be required to provide training for all equipment they supply – China or Thailand;
- post harvest handling maize/wheat and drying technology and techniques - Thailand or Australia;
- post harvest handling - Rice - Vietnam or Thailand.

Each study tour will accommodate 7 or 8 persons and will have duration of 2 -3 weeks. The CTA and the PHMPU will arrange for its organization.

County level training

It is expected that the county level trainers will be staff from the county offices of the MoA. County trainers will be provided different forms of training. Formal training will be augmented by participation in the assessment studies detailed later in this document and the study tours.

1. In-county Training

Post harvest practices and techniques: County trainers will receive a one week course on appropriate post harvest practices and techniques, together with participatory training and extension methodologies. The training content will be detailed in the master training manual.

Technology familiarization: County trainers will be provided one week of specialized training in the use of the new technologies introduced on the demonstration site.

Equipment maintenance and repair: County trainers will be provided one week of specialized training on the maintenance and repair of equipment introduced by the project.

Farm level training

1. In-county training

Awareness building: One of the main problems observed during the field visits, was that many farmers were not aware of the magnitude of the post harvest losses sustained. It is therefore important that farmers become aware of post harvest losses. Each farm will be provided a half day training programme designed to raise awareness on the subject.

Post harvest practices: On-farm training will be undertaken by the trained county officials using the provided training materials/handbook. Farmer training will be delivered to work team supervisors and other key farm personnel. Topics covered in the training will focus on the operational aspects of the newly introduced/modified practices. Training will be tailored to the crops handled by the respective farms under the demonstration scheme. It is expected that training will cover the following subject areas:

- Pre-harvest observation;
- Handling of crops in the field;
- Threshing/shelling;
- Transporting crops;
- Drying;
- Storage (on-farm/household);
- Pest infestation.

2. Study Tour

An in-country study tour will be organised to review the experiences of farms that have participated in the project in order to transfer the knowledge gained and lessons learned in adopting improved post harvest practices. Of particular importance will be a detailed review of the management arrangements and the specifics of machinery

operation and maintenance. Participants of the tour should be skilled machine operators and maintenance staff from each farm along with a senior member of farm management so that the needs are understood at both operational and supervisory levels. The study tour should also be accompanied by a relevant member of the PHMPU and a representative of the MoA. Participants are expected to act as master trainers and/or as resource persons within their respective farms.

The demonstration farms will hold an open day for neighbouring farms to observe the improved post harvest techniques and management practices. Each farm will be expected to hold three open days during the project cycle. Two additional in-country study tours will be organised to the demonstration farms supported by other donor funded projects.

Post Harvest Manual

A post-harvest manual targeted for master and county trainers will be prepared. The draft manual must be prepared before the master trainer course and must be evaluated by the master trainers, after which it must be adapted in accordance with their feedback. The initial draft will be prepared by the international post harvest expert with inputs from the CTA, other international consultants and programme staff and counterparts. The manual will be in the form of a ring-folder so that modules and topics can be updated according to experience gained. The manual will provide detailed guidance and background information for each training course. The final content will only be decided upon following the commencement of project implementation. The focus will be specifically on raising awareness of post harvest losses and on the application of improved practices. It is expected that, towards the end of the project implementation phase, this manual will have been field-tested, updated and be suitable for dissemination.

The county training officer will require in addition to the manual, on-farm training materials to be able to implement training courses targeted to the farmers. Furthermore, he/she will be the designated focal point for post-harvest issues at the county level, and will, therefore, need reference material. The manual will also provide dissemination material and forms to be able to report on the performance of the demonstration units being tested.

C. TRAINING COSTS*

Activity	No. of Training	PY1	PY2	PY3	Perdiem(Participants/Resource Persons)	Room Rental	Stationery	Snacks	Total (US D)
Workshops									
Project inception training and project launch (15 participants)	1	356			231	65	30	30	356
Annual review (50 participants)	1	933	933		1 336	130	200	200	1 866
End-of-Project (50 participants)	1			951	686	65	100	100	951
Study tour workshop	3		2 853		2 058	195	300	300	2 853
Survey workshop	3	951	951	951	2 058	195	300	300	2 853
Printing training manuals		1 000							1 000
Printing farmer material			3,000						3 000
Sub Total		**3 240**	**7 737**	**1 902**	**6 369**	**650**	**930**	**930**	**12 879**
Training									
Master trainer									
Post harvest management and techniques (20 participants)	1	441			296	65	40	40	441
Agricultural engineering (20 participants)	1		405		296	65	40	40	441
On - farm logistics (20 participants)	1	405			296	65	40	40	441
Sub Total		**846**	**405**		**888**	**195**	**120**	**120**	**1 251**
County level									
Post harvest practices and techniques (20 participants)	1		2 500		36				2 536
Technology familiarization (20 participants)	1		2 500		36				2 536
Equipment maintenance and repair (20 participants)	1		2500		36				2 536
Sub Total			**7 500**						**7 608**
Farm Level									

Awareness building (100 participants)	6		8 616		6 216		1 200	1 200	8 616
Pre harvest observation (100 participants)	6			8 616	6 216		1 200	1 200	8 616
Handling of crops in the field (100 participants)	6			8 616	6 216		1 200	1 200	8 616
Threshing/shelling techniques (100 participants)	6			8 616	6 216		1 200	1 200	8 616
Transporting crops (100 participants)	6			8 616	6 216		1 200	1 200	8 616
Drying techniques (100 participants)	6			8 616	6 216		1 200	1 200	8 616
Storage (on-farm/household) (100 participants)	6			8 616	6 216		1 200	200	8 616
Rice milling techniques	6			8 616	6 216		1 200	1 200	8 616
Pest infestation (100 participants)	6			8 616	6 216		1 200	1 200	8 616
Sub Total			**8 616**	**68 928**					**77 544**
Study Tours (Overseas)									
Agricultural engineering (5 participants, China or Malaysia)	1		27 000						27 000
Post harvest handling maize/wheat, drying technology(5 participants, Thailand or Australia)	1	27 000							27 000
Post harvest handling-Rice-Vietnam or Thailand	1			27 000					27 000
Sub Total		**27 000**	**27000**	**27 000**					**81 000**
Study tours (In-Country)									
Study tour to review of all the demonstration farms (35 Participants)	1			2 500					2 500
Sub Total				**2 500**					**2 500**
Total		**31 086**	**51 258**	**100 330**					**182 782**

* The rates follow HACT agreed and applied by EXCOM agencies. The rates are; 1 300 Korean Won (equivalent to around USD 13 at current UN rate) per participant per day in Pyongyang and Provincial capitals and 963 Korean Won (equivalent to around USD 10) in counties and elsewhere. Meeting room charges in Pyongyang and Provincial capitals is around USD 65 per day and there is no room charge in counties and elsewhere. Stationeries cost 180 Korean Won (around USD 2) per participant, while snacks cost the same per day.

Appendix 3 Assessment Studies

The project shall commission a number of studies; each study will evaluate the current conditions and will be used as a basis for developing new technology/strategies for implementation of the project.

Assessment of on-farm post harvest losses: This assessment will measure post harvest losses from harvesting to storage. Two types of post harvest loss assessments will be required:

At the beginning of the project a baseline study will be undertaken at each of the demonstration farms

In years 2 and 3 additional assessments of post harvest loss will be undertaken at the demonstration farms and at 4 neighbouring farms

Assessment of on-farm storage: This assessment will identify local storage structures and storage practices, providing information on the range of products stored and the length of time over which they are stored. The study will evaluate the conditions of the on-farm stores and provide recommendations for improved storage design based on locally available construction materials and farm practices

Assessment of on-farm logistics: This assessment will determine the movement of harvested product, grains, people and equipment on farms. The basis of the study will start at harvest and will follow the movement of produce to either the central store after processing, farm gate or farmers households.

Assessment of post-harvest loss through the distribution system: This assessment will assess post harvest losses post farmgate. An analysis of the distribution of farm goods to the PDS and end user, modes of transport, suitable of PDS and other stores The study will determine the major post-harvest grain loss factors; and provide recommendations for a post-harvest loss reduction and quality enhancing strategy for food grain, as well as increasing local food reserves.

Appendix 4 Terms of Reference of National Experts

1. National Consultant - Equipment Maintenance Specialist

Duty Station: Pyongyang, with regular trips to project farms.

Duration: Four months during a period of one year on a "when actually employed basis".

Duties:

In close consultation with the PHMPU and relevant institutes the duties of the national consultant would include:

- Attend the project launch workshop as a resource person and advise on project implementation strategies;
- Assist in developing the maintenance procedures and logs;
- Assist in training county/farm engineers in the maintenance procedures and logs;
- Monitor all equipment check that maintenance is carried out as specified in the procedures; and
- Submit periodic reports according to UNDP guidelines for technical clearance and prepare a final technical report.

Qualifications: Relevant degree in agriculture engineering and at least **10** years experience in agricultural machinery. Familiarity with, and ability to use, computerized systems. Working knowledge of English.

2. National Consultant - Rice Post Harvest Specialist - 2 persons

Duty Station: Pyongyang, with regular trips to project farms.

Duration: Four months during a year period on a "when actually employed basis".

Duties:

In close consultation with the PHMPU and relevant institutes the duties of the national consultant would include:

- Serve as a resource person to the project launch workshop and advise on project implementation strategies.
- Assist in:

- Evaluation of on-farm logistics;
- Testing methods to efficiently utilise the mobile threshers and developing work procedures;
- Testing methods to efficiently utilize the two wheel tractors and developing work procedures;
- Assist with the field school to test equipment;
- Developing and implementing the improved on-farm logistics plan;
- Training country officers;
- Commissioning equipment and introducing the technology packages;
- Monitoring the demonstration farms; and the demonstration farm study tours;
- Submit periodic reports according to UNDP guidelines for technical clearance and prepare a final technical report.

Qualifications: Relevant degree in agriculture and at least 10 years experience in agricultural science and technology with specific experience in post harvest technology and management. Familiarity with, and ability to use, computerised systems. Working knowledge of English

3. National Consultant - Maize Post Harvest Specialist - 2 persons

Duty Station: Pyongyang, with regular trips to project farms.

Duration: Three months during a one-year period on a "when actually employed basis".

Duties: In close consultation with the PHMPU and relevant institutes the duties of the national consultant would include:

- Attend the project launch workshop as a resource person and advise on project implementation strategies.
- Assist in:
  - Evaluating on-farm logistics;
  - Testing methods to efficiently utilise the sheller and developing work procedures;
  - Testing methods to efficiently utilize the two wheel tractors and developing work procedures;
  - Assist in the field school to test equipment;
  - Developing and implementing the improved on-farm logistics plan;
  - Training country officers;
  - Commissioning equipment and introducing the technology packages;
  - Monitoring the demonstration farms;
  - Assist in the demonstration farm study tours; and
  - Submit periodic reports according to UNDP guidelines for technical clearance and prepare a final technical report.

Qualifications: Relevant degree in agriculture and at least 10 years experience in agricultural science and technology with specific experience in post harvest technology and management. Familiarity with, and ability to use, computerized systems. Working knowledge of English.

4. National Consultant - Wheat Post Harvest Specialist -1 person

Duty Station: Pyongyang, with regular trips to project farms.

Duration: Four months during a year period on a "when actually employed basis."

Duties: In close consultation with the PHMPU and relevant institutes the duties of the national consultant would include:

- Attend the project launch workshop as a resource person and advise on project implementation strategies.
- Assist in:
  - Evaluating on-farm logistics;
  - Testing methods to efficiently utilise the thresher and developing work procedures;
  - Testing methods to efficiently utilize the two wheel tractors and developing work procedures;

- Assist in the field school to test equipment;
- Developing and implementing the improved on-farm logistics plan;
- Training country officers;
- Commissioning equipment and introducing the technology packages;
- Monitoring the demonstration farms; andAssist in the demonstration farm study tours;
- Submit periodic reports according to UNDP guidelines for technical clearance and prepare a final technical report.

Qualifications: Relevant degree in agriculture and at least 10 years experience in agricultural science and technology with specific experience in post harvest technology and management. Familiarity with, and ability to use, computerised systems. Working knowledge of English.

5. National Consultant - Drying Technology Specialist - 1 person

Duty Station: Pyongyang, with regular trips to project farms

Duration: Two months during a year period on a "when actually employed basis".

Duties: In close consultation with the PHMPU and relevant institutes, the duties of the national consultant would include:

- Attend the project launch workshop as a resource person and advise on project implementation strategies;
- Evaluate on-farm drying procedures;
- Prepare a report; and
- Assist in developing improved rice drying procedures.

Qualifications: Relevant degree in agriculture or food engineering and at least 10 years experience in agricultural science and technology with specific experience in the area of crop drying. Familiarity with, and ability to use, computerised systems. Working knowledge of English.

Appendix 5 FAO Technical Backstopping Officer (RAP)

The FAO Technical Backstopping Officer (RAP) will undertake three missions during the project implementation period of 2 ½ years. The mission period and activities during each mission are detailed below:

(a) Year 1: 15 days

The FAO Technical Backstopping Officer shall:

- identify international project personnel;
- review the start-up activities of the project and advise on developing the detailed project work plan;
- participate in the project launch workshop;
- visit project sites and monitor activities, identify corrective actions needed and recommend follow up
- advise on the design of study tours;
- review the inception report and the first progress report of the CTA and provide necessary inputs;
- review the reports of the Project Board and PTC meetings;
- review the design of monitoring and evaluation systems being developed under the project and make recommendations for their improvement; and
- Prepare a back-to-office report with a summary of activities undertaken, findings, conclusions and recommendations for follow-up.

(b) Year 2 : 10 days

The Backstopping officer will:

- participate in the mid-term technical review and appraisal of the project;
- review the progress reports of the CTA and provide inputs;
- review the reports of the PROJECT BOARD and PTC meetings inputs;
- visit project sites and monitor activities, identify corrective actions needed and recommend follow-up
- make further recommendations on the monitoring and evaluation systems being developed under the project;
- review the draft training materials on post-harvest management and make inputs as appropriate;
- review recommendations made pertinent to foreign study tours and advise on the suitability of institutions and sites recommended;
- contribute to training activities on safety and quality aspects of grain post-harvest handling;
- prepare a back-to-office report with a summary of activities undertaken, findings, conclusions and recommendations for follow-up.

(c) Year 3: 10 days

The Backstopping officer will:

- review the progress report of the CTA and recommend possible adjustments to the project;
- visit project sites and monitor activities, identify corrective actions needed and recommend follow-up;
- review the findings of the loss assessment reports and make recommendations on a course of action;
- Review the terminal report prepared by the CTA ;
- prepare a back-to-office report with a summary of activities undertaken, findings, conclusions and recommendations for follow-up.

Appendix 6 **Project Budget**

Budget Line	Description	Period		Total	
		from	to	m/m	US D
FAO					**1 705 586**
Personnel (International)					**462 900**
71200	Chief Technical Advisor			18	354 500
71200	Agricultural Engineering Expert			2.5	49 300
71200	Post harvest Expert			3	59 100
Personnel (National)					**31 200**
71300	Consultant-Equipment maintenance			4	3 200
71300	2 Consultant-Rice post harvest handling			4	6 400
71300	2 Consultant-Maize post harvest handling			4	6 400
71300	Consultant-wheat post harvest handling			4	3 200
71300	Consultant-Drying technology			2	1 600
71300	National M & E Officer			4	3 200
61200	Project Driver			12	7 200
Training					**182 782**
75700	International Training				81 000
75700	In-Country Training				101 782
Equipment					**641 650**
72200	Non-Expendable				475 650
72200	Expendable (bags, tarpaulins and plastic sheets)				166 000
Travel					**29 700**
71600	International (Airfare+DSA)				22 700
71600	Local				7 000
Contracts					**160 000**
72100	Assessment of on-farm post harvest losses				5 000
72100	Assessment of on-farm storage				5 000
72100	Assessment of on-farm logistics				5 000
72100	Assessment of post-harvest loss through the distribution system				5 000
72100	Subcontract for Maize Storage (50t capacity) Construction [8]				20 000
72100	Subcontract for Drying Facility construction[9]				30 000
72100	Subcontract for Threshing Centre Pavement[10]				90 000
General Operating Expenses					**12 000**
74500	Sundry				7 000

[8] Plan to construct a maize store at a project farm.

[9] Plan to pave yards and install roofing at two project farms.

[10] Plan to pave yards and install roofing at a threshing centre each at six project farms.□

73100	Rental and Maintenance-Premises				5 000
FAO Direct Technical Assistance					**181 154**
72100	FAO Technical Backstopping				35 600
71600	Backstopping Missions (DSA + travel)				12 200
75100	FAO Project Support costs (7% on equipment, 10% other budget lines)				137 554
UNDP					**93 100**
Personnel (International)					**78 400**
71200	UNDP Procurement Officer			4	54 400
71200	UNDP UNV IT Specialist			4	24 000
Personnel (National)					**3 200**
71300	UNDP National Admin Assistant			4	3 200
Equipment					**1 500**
72200	Non-Expendable				1 500
Travel					**10 000**
71600	Travel-Other (Monitoring and Evaluation cost)				10 000
Total					**1 798 686**

Appendix 7 Terms of Reference of Project Board

Overall responsibilities[11]: The Project Board is the group responsible for making by consensus management decisions for a project when guidance is required by the Project Manager, including recommendation for UNDP/Implementing Partner approval of project plans and revisions. In order to ensure UNDP's ultimate accountability, Project Board decisions should be made in accordance to standards[12] that shall ensure best value to money, fairness, integrity transparency and effective international competition. In case a consensus cannot be reached, final decision shall rest with the UNDP Programme Manager. Project reviews by this group are made at designated decision points during the running of a project, or as necessary when raised by the Project Manager. This group is consulted by the Project Manager for decisions when PM tolerances (normally in terms of time and budget) have been exceeded.

Based on the approved annual work plan (AWP), the Project Board may review and approve project quarterly plans when required and authorizes any major deviation from these agreed quarterly plans. It is the authority that signs off the completion of each quarterly plan as well as authorizes the start of the next quarterly plan. It ensures that required resources are committed and arbitrates on any conflicts within the project or negotiates a solution to any problems between the project and external bodies. In addition, it approves the appointment and responsibilities of the Project Manager and any delegation of its Project Assurance responsibilities.

Composition and organization: This group contains three roles, including:

1) An Executive: individual representing the project ownership to chair the group.
2) Senior Supplier: individual or group representing the interests of the parties concerned which provide funding and/or technical expertise to the project. The Senior Supplier's primary function within the Board is to provide guidance regarding the technical feasibility of the project.
3) Senior Beneficiary: individual or group of individuals representing the interests of those who will ultimately benefit from the project. The Senior Beneficiary's primary function within the Board is to ensure the realization of project results from the perspective of project beneficiaries.
4) Project Assurance: this role supports the Project Board executive by carrying out objective and independent project oversight and monitoring functions. Project Manager and Project Assurance are distinct functions not be held out by same individual.
5) Project Operational and Technical Supervision: this involves project administrative, management and technical supervision to Project Manager as required by needs of individual project or Project Manager.

Potential members of the Project Board are reviewed and recommended for approval during the LPAC[13] meeting. For example, the Executive role can be held by a representative from the Government Cooperating Agency or UNDP, the Senior Supplier role is held by a representative of FAO, and the Senior Beneficiary role is held by a

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[11] Source: Guidelines on UNDP Implementation of UNDAF Annual Review Process

[12] UNDP Financial Rules and Regulations: Chapter E, Regulation 16.05: a) The administration by executing entities or, under the harmonized operational modalities, implementing partners, of resources obtained from or through UNDP shall be carried out under their respective financial regulations, rules, practices and procedures only to the extent that they do not contravene the principles of the Financial Regulations and Rules of UNDP; b) Where the financial governance of an executing entity or, under the harmonized operational modalities, implementing partner, does not provide the required guidance to ensure best value for money, fairness, integrity, transparency, and effective international competition, that of UNDP shall apply.

[13] Depending on its composition, the Project Board can fulfill the function of the Project Appraisal Committee (LPAC)

Specific responsibilities:

Defining a project

- Review and approve the Initiation Plan (if such plan was required and submitted to the LPAC).

Initiating a project

- Agree on Project Manager's responsibilities, as well as the responsibilities of the other members of the Project Management team;
- Delegate any Project Assurance function as appropriate;
- Review the Progress Report for the Initiation Stage (if an Initiation Plan was required);
- Review and appraise detailed Project Plan and AWP, including Atlas reports covering activity definition, quality criteria, issue log, updated risk log and the monitoring and communication plan.

Running a project

- Provide overall guidance and direction to the project, ensuring it remains within any specified constraints;
- Address project issues as raised by the Project Manager;
- Provide guidance and agree on possible countermeasures/management actions to address specific risks;
- Agree on Project Manager's tolerances in the Annual Work Plan and quarterly plans when required;
- Conduct regular meetings to review the Project Quarterly Progress Report and provide direction and recommendations to ensure that the agreed deliverables are produced satisfactorily according to plans.
- Review Combined Delivery Reports (CDR) prior to certification by the Implementing Partner;
- Appraise the Project Annual Review Report, make recommendations for the next AWP, and inform the Project Board about the results of the review;
- Review and approve end project report, make recommendations for follow-on actions;
- Provide ad-hoc direction and advice for exception situations when project manager's tolerances are exceeded;
- Assess and decide on project changes through revisions.

Closing a project

- Assure that all Project deliverables have been produced satisfactorily;
- Review and approve the Final Project Review Report, including Lessons-learned;
- Make recommendations for follow-on actions to be submitted to the Project Board;
- Commission project evaluation (only when required by partnership agreement);
- Notify operational completion of the project to the Project Board.

Appendix 8 Pre-Implementation Prerequisites

A major bottleneck that could impede smooth implementation of the project is the absence of adequately English-translated documents that are vital to the more informed understanding of the state of the food and agriculture situation in the Democratic People's Republic of Korea. To forestall this problem from occurring in the project, the Government should immediately take steps to effect the translation into the English language of all documents which should provide a clear description of the nature, processes applied and uses of existing agricultural information. Specifically, the documentation/English translation should focus on the following:

a) input reporting forms;
b) frequency of collection of information;
c) description of the flow of data from the source agency to the Ministry of Agriculture's computer centre;
d) data processing and computer program algorithms used for data capture and report preparation; and
e) typing of reports including samples of report formats and contents.

All documentation processes should be completed and made available for use by the International Consultants prior to their arrival to the country for the first mission.