**Young Scientist Pilot Research Project**

**Research Title:**

**INTRODUCTION** (**Guiding template only**)

Food legumes have multiple uses. They are used as human foods, animal feeds, cover crops, relay crops and green manure crop. They are important sources of proteins, oil and vitamin B. In crop production legumes’ capacity to fix nitrogen highlights their importance because nitrogen is considered one the limiting nutrient in any production system. Several legumes are considered traditional food because they are essential for rural subsistence, livelihood and health (Johns, 2006). Identified species of legumes utilized as food are mostly *Vigna* species namely, cowpea (*Vigna unguiculata*), stringbeans or yardlong beans (*Vigna unguiculata* ssp. *sesquipedalis*), mungbean (*Vigna radiata*) and ricebean (*Vigna umbellata*). In the Philippines, mungbean and yardlong beans are planted to 45,584.26 hectares and 13,766.05 hectares having a volume of production of 32,420.73 MT and 119,503.06 MT, respectively (Philippine Statistics Authority, 2013). The other Vigna crops are not reflected in the data due to minimal production in the country. Yields of food legumes continue to lag behind major cereal crops like rice and corn. Most farmers have forgotten or abandoned their old cultivars, like pigeon pea, and or have completely replaced food legume species with other profitable crops.

In the Philippines, the national genebank or National Plant Genetic Resources Laboratory (NPGRL) of the Institute of Plant Breeding, UPLB holds significant germplasm collections of legumes. However, the quality and quantity of the collections were greatly affected by the typhoon Milenyo in 2006. About 4% of the collection was lost and that is only verified by physical inventory. Extensive regeneration was initiated thereafter. The low viability is exacerbated by the flooding and submergence of the collection in 2006. Similar trends maybe expected with other species of food legumes. Therefore, it is timely to regenerate the food legume collections at NPGRL to determine the actual number of viable accessions and to collect and recollect the lost collections.

Collecting, regeneration, characterization and evaluation of germplasm collections for agronomic traits and reactions to field diseases can help increase the use of food legumes, through their sustainable use in crop improvement programs and direct use in farming systems.

The food legumes collections have not been fully characterized yet and have never been evaluated for traits important for adaptation to climate changes and emerging pests and diseases.

**Project Justification (Guiding template only)**

Large degree of genetic erosion is evident in major food crops that are the basis of food and nutrition security and livelihood of Nepalese people. It is estimated that 50% of traditional varieties have disappeared from farmers’ field. Farmers in many areas still have landraces being grown and maintained. This necessitates the need for exploration, collection, conservation and utilization. After the establishment of Genebank and with support from RDA, Korea and others, many advances have been made and APGR are being effectively conserved in different kinds of Banks, eg Seed Bank, Tissue Bank, Field Genebank. It is now very important to explore the potential of these collections for improving the agricultural production system. This project is conceptualized with the goal of enhancing utilization of two major crops, ie rice and buckwheat through characterization at both phenotypic and genotypic levels and by developing some pre-breeding lines.

**Project Goal (Guiding template only)**

* Enhance food security through efficient and effective conservation, use and management of rice and buckwheat genetic resources in Nepal

**Project Objectives (Guiding template only)**

* To characterize 150 accessions of rice and 50 accessions of buckwheat (both common and tartary buckwheat) germplasm at phenotypic and genotypic levels.
* To provide elite lines to researchers and farmers
* To share the conserved and characterized information along with germplasm with breeders, farmers and researchers.
* To strengthen national capacity for undertaking efficient and effective characterization of APGR
* To manage duplicate accessions of these two crops.
* To document research findings.

**Project Activities (Guiding template only)**

1. **Management of rice and buckwheat genetic resources**
   1. Exploration, collection and gap analysis
   2. Identification of rice and buckwheat accessions from the Genebank for further characterization and pre-breeding works
   3. Safety duplication in World Seed Vault
   4. Database management
   5. Duplicate accessions management
2. **Characterization and genetic enhancement of rice and buckwheat**
   1. Characterization, evaluation and diversity analysis (phenotypic and genotypic)
   2. Pre-breeding
3. **Human resources interaction** 
   1. Training on APGR conservation and utilization
   2. Training and exposure visit to Genebank personnel

**Project Outcomes (Guiding template only)**

## 150 accessions of rice, 50 accessions of buckwheat germplasm will be characterized (in good agronomic trait, blast and BLB resistance, good grain setting in buckwheat, easy de-husking types, etc)

## Characterized and conserved accessions of rice and buckwheat will be shared among plant breeders, farmers for use in their breeding program

## 3 elite lines will be developed through pre breeding in each of rice and buckwheat

## Passport, characterization, evaluation data will be made available through website

## Duplicate accessions of two crops will be managed

* At least one research paper related to genetic diversity will be published
* Capacity of 6 researchers will be enhanced
* 100 accessions of rice and buckwheat will be conserved as safety duplicates in World Seed Vault

**Project Beneficiaries (Guiding template only)**

* Farmers, Breeders, Students, Policy makers, Agricultural researchers and extension workers, Seed companies, etc

**Project Team (Sample)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| SN | **Name** | **Experience**  **(year)** | **Qualification** | **Discipline** | **Role in project** |
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**Time frame:** 2 years (November 2016-October 2018) **(Guiding template only)**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Activity** | **2016** | | | | **2017** | | | |
| 1 | Morphological and molecular characterization of *Capsicum* accessions |  |  |  |  |  |  |  |  |
| 2 | Agronomic evaluation of *Capsicum* accessions for yield, biotic and abiotic stress tolerance and quality |  |  |  |  |  |  |  |  |
| 3 | Promotion of the use of superior *Capsicum* accessions |  |  |  |  |  |  |  |  |
| 4 | Morphological and molecular characterization of *Dioscorea* accessions |  |  |  |  |  |  |  |  |
| 5 | Agronomic evaluation of *Dioscorea* accessions for yield, biotic and abiotic stress tolerance and quality |  |  |  |  |  |  |  |  |
| 6 | Promotion of the use of superior *Dioscorea* accessions |  |  |  |  |  |  |  |  |
| 7 | Agronomic evaluation of *Centella asiatica* accessions for yield, biotic and abiotic stress tolerance and quality |  |  |  |  |  |  |  |  |
| 8 | Promotion of the use of superior *Centella asiatica* accessions |  |  |  |  |  |  |  |  |
| 9 | Training programmes and communication of research results |  |  |  |  |  |  |  |  |

**BUDGET REQUIREMENT FOR THE PROJECT** **(Guiding template only)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **[Unit: USD]** | | | | | |
| **Items** | | **1st Year** | **2nd Year** | **Total** | **Remarks** |
| Direct costs | Personnel (Occasional) | 2,000 | 2,000 | 4,000 |  |
| Local travel | 1,000 | 1,000 | 2,000 |  |
| International workshop | 5,000 | 3,000 | 8,000 |  |
| Supplies (chemicals, research materials, etc.) | 5,000 | 7,000 | 12,000 |  |
| Others | 1,000 | 1,000 | 2,000 |  |
| Indirect costs | | 1,000 | 1,000 | 2,000 |  |
| Total | | 15,000 | 15,000 | 30,000 |  |

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| --- |
| Note:   * Personnel Expense: RDA shall not support salaries for permanent researchers of implementing organizations. However, RDA can possibly provide budget for the short-term staff who are hired for collaboration research project. * Travel: Travel expense includes budget for transportation, accommodation, and meal. * Supplies: Supply expense refers to expenses for expendable supplies such as reagents. * Equipment: RDA will not support expensive equipment such as vehicles (including motorcycle). Implementing agencies can purchase equipment under 500USD. * Indirect Costs: Indirect Cost cannot be over 10% of total budget. |

**Representative Organization, Principal Investigator and Bank Accounts**

**For KAFACI Research Project**

**Country:**

**Project Title:**

1. **Principal Implementing Organization**

* **Name of organization:**
* **Name of Head:**
* **Address:**
* **Phone:** +
* **Fax:** +
* **Email:**
* **Principal Investigator:**
* **Name of organization:**
* **Position/Job title:**
* **Address**:
* **Phone:**
* **Fax:**
* **Email:**

1. **Bank Account Detail**

* **Name of Bank:**
* **Address of Bank:**
* **Swift Code:**
* **Account Name:**
* **Account Number:**