

## **Section 2**

### **Executive summary of the project-**

Weedy rice of the family Poaceae is a weed accompanying rice and is widely distributed in rice-planting areas all over the world, particularly in South and South-east Asia, South and North America and Southern Europe (Ferreero *et al.*, 1999). Weedy rice is taxonomically classified as the same species as cultivated rice (*Oryza sativa*) but is strongly characterized by seed shattering and dormancy, which apparently increase the distribution of this species. As a notorious weed occurring commonly in rice fields, weedy rice causes significant yield reduction (Labrada, 2002) and affects the quality of rice grain (Hougland and Paul, 1978). Most weedy rice strains possess seeds with red pericarps, thus it is also referred to as red rice, although some strains have white pericarps (Gealy *et al.*, 2003). The incidence of weedy rice, a problem, has aggravated with the increase of direct-seeded rice in several countries. Morphologically weedy rice is highly variable and appears to be an intermediate between wild and cultivated rice. Long-term sympatric distribution has led to similarities between weedy and cultivated rice through natural hybridization and introgression, making the control of weedy rice very difficult when compared with other weeds (Qianjin *et al.*, 2006). Weedy rice was reported first in the Eastern Provinces of Sri Lanka in early 1990s, has now spread into many rice growing areas irrespective of the agro-ecological zones in the country (Abeysekera, 2010). Although, currently Department of Agriculture has already developed the effective controlling package and giving awareness program to the farmers, they are reluctant to remove weedy rice, because it is identical to cultivated rice in first few generations. Therefore, weedy rice problem has aggravated and reduced the cultivated rice yield. Selective herbicides cannot be used to control weedy rice during the crop growth stages due to its physiological and morphological similarity (Abeysekera *et al.*, 2010). Thus, farmers are unable to take a clean paddy harvest. Although rice is a self pollinated plant, cross pollination in rice takes place to a certain extent, Previous data reported that natural out-crossing between different rice varieties in Sri Lanka ranges between 0.34 and 0.67 %, resulted in considerable increases of weedy rice in rice fields by out-crossing wild rice (*O. nivara* and *O. rufipogon*) and cultivated rice (Chen *et al.*, 2004). Recent results (RRDI Annual reports, 2010) report the out-crossing rate ranged between 0-20 percent. Present research focuses on the level of genetic diversity of weedy rice population found in different agro-ecological zones where weedy rice problem is considerably high. The present research carried out on the agro-morphological and molecular studies in order to explore the possible origin of weedy rice by comparing the genetic relationships of weedy rice populations with a wide range of recommended-cultivated rice (*O. sativa*) varieties and wild rice (*O. rufipogon* and *O. nivara*) populations. Once the potential out crossing cultivated rice varieties are identified, it is possible to avoid the cultivation of such rice varieties in the areas of high weedy rice infestation and to lessen the weedy rice threat in Sri Lanka.

### **Objectives of the project**

- Assessment of the level and distribution of genetic diversity of weedy rice population in Sri Lanka.
- Tracing the possible genetic origin of weedy rice found in the paddy fields in Sri Lanka.