Agriculture, plant germplasm and crop varieties were treated differently from the industrial products in the past but not any more. There are reportedly 75,000 species of edible plants worldwide but only 7,000 of them have been used for food and out of these less than 700 are actually commercialized currently (Chaudhary, 2000). Origin and speciation of most crops is million of years old while domestication is relatively recent. It is a notable fact that the currently exported food crops from the developed countries did not originate there. These crops were introduced in those “cash rich” countries, almost for free, from the “gene-rich” countries during the last 10,000 years, mostly during last 500 years. The agro-biodiversity created and fostered with human intervention across 12,000 years history of agriculture has stood the test of time and synergy with societies. Human civilizations exploited the germplasm for food, fiber, fuel and other purposes. Central dogma was the welfare of human beings with simple rules but not with individualization and profit motive. Scenes have changed now and the technology rich are exploiting the germplasm rich countries.

Rice varieties probably emerged 10,000 to 15,000 years ago along the southern and northern slopes of Himalayas and withstood the periods of drought and pronounced variations in temperature and later spread from Himalayas to north-east and eastern India, northern southeast Asia and south China (Sharma, 1998). Himachal Pradesh, Uttarakhand and Jammu and Kashmir states in northwest Himalayas have great diversity of traditional rice varieties. There are few sectors in agriculture where the so-called Green Revolution had such an overwhelming impact as in rice production. In 1966, the International Rice Research Institute (IRRI) released the first high yielding rice variety in the Philippines. In the subsequent decade a small number of such high yielding varieties almost completely replaced thousands of the traditional rice landraces previously cultivated by the farmers. Today most of the rice fields throughout Asia are occupied by merely a small number of high yielding rice varieties. Many landraces are preserved in seed banks, but these are not accessible to the farmers. Furthermore, this kind of conservation does not allow the rice varieties to adapt to changing environmental settings and changing agricultural practices. In contrast, on-farm conservation of diverse rice landraces is dynamic. Consequently, ensuring genetic diversity requires that rice landraces are cultivated continuously, and not simply stored in seed banks.
Genetic diversity is known to substantially decrease a crop’s vulnerability to diseases.

Rice is an important cereal crop of Himachal Pradesh next only to maize during wet season. Rice accounts for 10.8% of area and 10.2% of production on total food grain basis and 22.2% of area and 18.8% of production on wet season crops basis in the state. In the state during 2004-05, it was cultivated on 79,500 hectares with production of 1,09,130 tonnes (Anonymous, 2007). Rice is cultivated in ten of the twelve districts of the state except Kinnaur and Lahaul & Spiti with Kangra and Mandi districts alone accounting for 71.2 per cent of area and 69.7 per cent of production. There is a great diversity of agro-climatic conditions under which rice is cultivated and its cultivation extends from foot-hills (350 m) to high hills (upto 2300 m).

The area under traditional rice varieties is considerably low. However, some traditional varieties are still grown in some isolated pockets because of their adaptability to stress situations like drought, quick germination, quality preference, early maturity and cold tolerance etc. in those specific pockets. These are found in mid and high hills. In the mid hill traditional varieties like Kalizhini, Madhu Malti, Muskan, Achhoo, Chetru Basmati, Seond Basmati, Ram Jawain, Hatkoti Basmati and Panarsa local are grown for their local preference for quality (Katoch et al., 1987, 2001).

In the high hills, traditional varieties are Jattoo, Matali, Lal Dhan, Deval, Chohatoo and Sukara Dhan etc. People in the high hills prefer rices, which cooks sticky. In Kullu Valley and high hills of Shimla and Sirmour districts red rices (red pericarp) are still being grown because of local preferences and fetch premium price. Rana et al. (2000) conducted survey of paddy land races in Himachal Pradesh and reported that about 100 landraces were being grown in the state in late seventies (1977-78) and over a period of 20 years, 50-55 per cent have gone out of cultivation. Local rice varieties have tremendous morphological diversity. Purple leaved rices are grown to fight the wild rice problem. Red pericarp rices, purple leaved rices and quality rices need to be documented to protect them. A perfect system to identify landraces is the most fundamental requirement to enforce the propriety over plant varieties and germplasm. Variability in morphological, biochemical and molecular markers are the tools available for characterizing variability.

The presence of sufficient variability, the knowledge of nature of association among different characters and relative contribution of different characters to yield is a pre-requisite to any breeding
programme. Over the last 40 years continued spread of semi dwarf varieties has narrowed down the genetic base. There is urgent need to diversify this base by inducting traditional varieties of the state in the breeding programme. Keeping this in view, the present study was undertaken with the following objectives:

1. Characterization of germplasm for morpho-physiological traits and morphological markers eg. pigmentation of different plant parts,

2. Characterization of grain quality traits and nutritional profile of genotypes,

3. Molecular characterization of genotypes using RAPD and ISSR markers,

4. To study association among different traits and to determine the direct and indirect contributions of different traits on grain yield, and

5. To characterize diversity in land races using genetic divergence analysis ($D^2$ statistics).