The present project evaluated the genetic diversity in twenty three natural teak 
(*Tectona grandis* L.f.) populations in ten states in India (Kerala, Tamil Nadu, Karnataka, Andhra Pradesh, Maharashtra, Gujarat, Rajasthan, Madhya Pradesh, Chattisgarh and Orissa) with respect to growth, tree form, leaf and seed characters. Wood properties were also analyzed.

Regarding the tree form characters, straightness, persistence of axis, branch size, branching mode, clear bole ratio and also bole defects like knots, twist, fluting etc were examined. Observations showed that Hudsa (Teli variety) from Dandeli, Karnataka, is the provenance with best tree form having first place for many of the tree form traits. There are other provenances which are best performers in one or two traits. Branching mode without double limbs had highly significant positive correlation with persistence of axis, straightness and less twisting. Hence, branching mode (which can be assessed at an early age) can be an indicator for axis persistence and straightness of a tree.

The results showed that at higher altitudes, trees had a tendency to grow double limbed, and twisted with less axis persistence. Rainfall had highly significant positive correlation with small branch size with horizontal branching pattern. Rainfall also had strong negative correlation with leaf pubescence and a negative correlation with seed filling percentage.

On evaluation of the physical properties of the wood samples, significant variations were noted between provenances. Tree diameter at breast height (DBH) showed a positive correlation with age and heartwood percentage. Higher growth rate with mean ring width of above 4.7 mm and greater heartwood content (>90%) were noted in trees grown in southern states like Kerala, Tamil Nadu and Karnataka. Hudsa (Teli variety) from Dandeli (Karnataka) attained highest heartwood percentage (93%) in age class II (25-34 years) and III (35 to 44 years) in spite of small log size. On a whole, Nilambur provenance also showed high heartwood proportion along with wider growth rings.
indicating high growth rate. Teak from drier areas produced 10-15 percent less heartwood than teak from high rainfall areas with narrow growth rings as evident from this study.

Ring width differed significantly between the provenances and it varied within the age classes with maximum values recorded from Nilambur provenance (7.6 mm) followed by other provenances from Kerala and then Tamil Nadu (Ashambu), Karnataka, Maharashtra and Gujarat. The densest wood (692 kg/m3) was recorded from age class III in Banaswara provenance (Rajastan). Lightest wood (473 kg/m3) was obtained from age class I in Khariar provenance (Orissa) which was due to the faster growth rate at early years with a wide early wood band, large vessel diameter/ percentage, low fibre percentage and thin-walled fibres. The longest fibres (1.4 mm) were obtained from Konni.

Teak wood collected from drier localities of central parts of India were darker in colour than South Indian provenances. The Basthar provenance (Chattisgarh) possessed high amount of extractive content (12.3%, which is almost par with that reported from Nilambur provenance) and more attractive colour. Lignin content was found high in Burgi provenance (36.9%) from Madhya Pradesh.

Ex situ conservation of germplasm was established at Nilambur with 25 provenances. Konni, Arienkavu (Kerala) and Mandagadde (Karnataka) were found to be the best performers for early growth. There was high genetic coefficient of variation and moderate heritability for growth, which will help in exploiting the genetic gain through the selection of better provenances.

The study revealed that the South Indian teak provenances showed superior tree form, wood quality as well as growth characteristics suitable for future genetic conservation programmes. Development of hybrids between best performers for growth and excellent provenances for better tree form and other characters like extractive contents (an indicator for durability) would help the improvement of planting stock.