INTRODUCTION
The fast-growing world population has increased the needs of human beings. To meet these needs, efforts are being made towards the extension of cultivation and development of industries. The extension of cultivation has been disturbing the balance of nature to a great extent and the industrial developments are causing environmental pollution. It has, therefore, become essential for man to acquire a complete understanding of the organisms and the environment prevalent on the globe. In view of this, studies involving the interrelationship of living organisms and the physical environment (Ecosystem—Tansley, 1935; Biogeocenose—Sukachev, 1945; and "Study of structure and function of nature"—Odum, 1959) have been greatly emphasised for a better utilisation of living organic matter. Recognising the importance of a perfect understanding of the structure and function of different ecosystems, the International Council of Scientific Union launched the International Biological Programme (1967-72) which was mainly concerned with "The Biological Basis of Productivity and Human Welfare". Very recently the "Man and the Biosphere" programme was adopted by the general conference of the UNESCO at its 16th session. This is an interdisciplinary programme of research emphasizing an ecological approach to the study of interrelationship of man and the environment. The general objective of the programme is
to develop the basis within the natural and social sciences for rational use and conservation of the resources of the biosphere and for improvement of the relationship between man and the environment, to predict the consequences of today's actions on tomorrow's world and thereby to increase man's ability to manage efficiently the natural resources of the biosphere. The programme has also covered the study and comparison of the structure, function and dynamics of natural, modified and managed ecosystems.

Much work has been done on the organic productivity and its related aspects in major ecosystems of the world. Verudin (1956), Odum (1957a, 57b) and Jackson and Dence (1958) have made studies on the aquatic ecosystems. Odum and Hoskin (1957), Whittaker (1961), McConnel (1962) and Seyers (1963) have done some work in experimental ecosystem. In India, studies on aquatic ecosystem are scanty. Investigations on pond ecosystem have been made by Jha (1970) at Varanasi. Kaul, Zutshi and Vaas (1972) have studied the biomass production of some macrophytes in Jrinagar lakes. Ganpati (1972) has studied the organic production in seven types of aquatic ecosystem in India. Primary production and chlorophyll of aquatic ecosystem have been estimated by Shatnagar (1972) at PortoNovo.
Among the terrestrial ecosystems, the forests have received great attention in the past too, but the studies on production have, till recently, been confined to measurement of volumes of marketable timber (Spurr, 1962; Rusch, 1965; Proban, 1965). The situation in India is no better, and only similar data are available in plenty (Laurie and Santam, 1940; Griffith and Santam, 1943; Griffith, 1947; Seth and Labral, 1960a, b, c; Labral and Lala, 1964). During the recent years, however, numerous workers (Peareal, 1959; Ovington, 1957, 1962, 1965; Ovington and Hadgwick, 1959; Baskerville, 1955; Carlisle and Brown, 1966; Ogino et al, 1964; Todaki et al, 1961, 1962; Ogawa et al, 1965; Akra et al, 1967, Whittaker, 1961, 1966; Whittaker and Woodwell, 1968; Rodin and Bazilevic, 1966, 1968; Colley et al, 1969) have studied dry matter production of the forests within the framework of the I B P, but these studies confine themselves to the temperate and the rain forests. The tropical deciduous forests in general have received little attention, and in India, only a start has been made recently in this direction. Nisra et al (1967) have made some preliminary observations on the dry matter production of Jal (Shorea robusta). Singh (1963, 1969) has studied the litter production and decomposition. Panneya and Kuruvilla (1968) and Panneya et al (1970) have studied the relations between weight and volume of boles.
Deshbandhu (1969) has studied the structure and dry matter production of a tropical deciduous forest near Varanasi.

The seasonal change in the standing crop of above-ground parts and net primary shoot production of the Tundra ecosystem have been studied by Bliss (1956, 1962, 1966); Aleksandrova (1958); Billings and Bliss (1959); Paulson (1960), Scott and Billings (1964) and Kiecolf (1965). Primary production of four crops in Varanasi has been investigated by Misra and Pancoey (1972).

Comparative studies on plant biomass of prairie, savanna, oak wood and maize-field ecosystem have been made by Ovington et al (1963) and Ovington (1964). The Productivity studies have also been made by Weaver and Darland (1948), Hadley and Kieckhefer (1963), Cottam and Wilson (1966) and Cooke et al (1965). Iwaidi et al (1964) investigated the seasonal change in the standing crop and annual net production of different types of grassland communities of Central Japan. Some aspects of structure and function in *Andropogon virginicus* community have been studied by Golley (1965). Data on the productivity of abandoned old field have been collected by Odum (1960). Hiebert and Evans (1964) have studied the primary production and disappearance rate on an old field in south Michigan.
composition and net primary production within a native eastern north Dakota prairie have been studied by Hadley and Buccos (1967). Golley and Gentry (1966) have compared the variety and standing crop of vegetation on a one year and twelve year old fields. Westlake (1963) compared the productivity of different types of plant communities in arid, temperate and tropical climate.

Such types of works have recently begun in India. Choudhary (1967) has worked out the productivity and energetics of *Mischanthium annulatum* stands at Varanasi. Singh (1967) has studied the seasonal variation and net community production of a grassland at Varanasi. Singh and Misra (1968) have investigated the diversity, dominance and net production in the grasslands of Varanasi. Singh (1969) has studied the ecology of grasslands of Ujjain. Comparative study of productivity in monocultures of species of varied ecological characteristics has also been made (Ramkrishnan, 1972). At Kurukshetra Singh and Yadav (1972) have investigated the biomass structure and net primary productivity in the grassland ecosystem. Productivity of ruderal vegetation has been worked out by Chapekar (1972). Vyas, Garg, and Agrawal (1972) have determined the net above-ground production in the monsoon vegetation at Udaipur. The above-ground productivity of grasslands at Jodhpur has been studied by Gupta, Saxena and Sharma.
(1973). Vereshchagin (1973) has studied the Delhi grasslands. Billeore (1973) has investigated the net productivity and energetics of a grassland ecosystem at Mathura. Primary productivity of a grassland ecosystem at Ujjain has been studied by Asra (1973).

The present work has been undertaken to study the seasonal changes in the green and non-green standing crop of grasses, other species, litter and underground parts. An attempt has been made to estimate the annual net primary production. The grasslands of the area are open to heavy biotic disturbance. Therefore an effort has been made to study the effects of different frequencies of clipping on the net primary production. Disappearance rate of dead material has also been estimated.

With a view to study the seasonal variations in the standing crop of energy, caloric value of each attribute has been determined using oxygen bomb calorimeter. An attempt has also been made to compare the percentage efficiency of net primary production of Haipur grassland with different plant communities of the world.