

Energy budget in subsidized wheat and mustard Agro ecosystems of Agra Division

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SUMMARY

This paper presents the energy budget of some agroecosystems of Agra division. Out put and input amount of energy calculated in terms of above ground, below ground net production of different varieties and yield observed then converted the values in MJ of energy and to work out Energy input (agriculture subsidy) and out put (yield and straw) in crop. Input of biological materials and energy such as seeds, manure and human labour has been observed. Out put observed in terms of seed, fodder and crop residues from agro ecosystems. Out put input values of three wheat varieties are coming out more than 1 and Out put : Input values of two mustard varieties are coming out less than 1. These studies indicated wheat as the energy efficient crop of Agra Division. However wheat var. LOK-1 is more energy efficient variety. Indeed, the fertilizer input in case of wheat var. RR 21 is highest. Input of insecticides was almost negligible. It is recommend that based on experimental evidence, dose of fertilizer inputs be reduced to half.

Key words: Energy budget, Wheat, Mustard, Agro ecosystems, Agra division.

Agro ecosystem is a manmanaged ecosystem in which net primary produce is exported out of the ecosystem. Thus, minerals are not returned to the source and sink. Further in an ecosystem in addition to the selection of a cultivar, agricultural subsidy, like fertilizer, weedicide, insecticide and irrigation are employed. The agro ecosystems are “fossil fuel subsidized solar powered ecosystem” (Odum, 1975). The credit of doing a pioneering work on agro ecosystem studies in India goes to Mitchell (1979).

The comparative account of energy budget of hill agro ecosystem (including the slash & burn practice of Jhum cultivation) has been worked out by Ramakrishnan et al. (1981) and Tokey & Ramakrishnan (1982). Because of the considerable recycling of energy and materials Mitchell (1979) suggested that agro ecosystems in India can be described as “natural (subsidized) solar-powered ecosystem.” The objective of the present study was to determine the energy input and out put of subsidized wheat and mustard Agro ecosystems of Agra Division. In “HOLISTIC” Approach considering magnitude of energy input, to intercompare three different varieties of wheat and two varieties of mustard and to see which one is more efficient in terms of energy fixation to quantify energy input (auxillary force) and out put, there by.

MATERIALS AND METHODS

Agra lies between latitude N 26°45' and 27°24' and longitude E 77°26' and 78°51'. It has a total area of 2,952 Sq.km. Agra district is divided into four distinct tracts by the rivers Yamuna, Utangan or Banganga and Chambal. The greater part of the district lies South West of river Yamuna and north of its tributary Utangan. This tract is

remarkable for the uniformity of its soil, which is generally a fertile fresh alluvium (sandy loam).

The present studies comprised of inventory of two types of agro ecosystems, viz, wheat and mustard. These studies encompass primary producer compartment of agroecosystems and their interaction with abiotic state variables as well as driving variables. The present investigation was carried out a three different research sites

- 1- Raja Balwant Singh College Agricultural Farm
-Wheat var. UP 2338
-Mustard var. ROHNI
- 2- Private farm at Bainpur
-Wheat var. RR 21
- 3- Central Soil and Water Conservation Research Centre, Chhalesar
-Wheat var. LOK-1
-Mustard var. 45 JO2 Pioneer

At every location crop fields were selected and in different varieties of wheat and mustard data pertaining to following items were collected.

Above ground, below ground net production of different varieties and yield observed and converted the values in MJ of energy and to work out Energy input (agricultural subsidy) and Out put (yield and straw) in crops. Input of biological materials and energy such as seeds, manure and human labour has been observed. Output of seed, fodder and crop residues from agro ecosystems. The findings are based on the farmers own records, repeated questionnaires as well as actual field surveys over a period of three consecutive years (1996 to 1999). The energy equivalents are based on the data of Pimental *et al.*, (1973) for hybrid seeds for plant materials (wheat and mustard grain), Boerma

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