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Energy Balance of Rural Ecosystems In India

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Abstract. India is predominantly an agricultural and rural country. Across the country, the villages vary in geographical location, area, human and livestock population, availability of resources, agricultural practices, livelihood patterns etc. This study presents an estimation of net energy balance resulting from primary production vis-a-vis energy consumption through various components in a "Rural Ecosystem". Seven sites located in different agroclimatic regions of India were studied. An end use energy accounting "Rural Energy Balance Model" is developed for input-output analysis of various energy flows of production, consumption, import and export through various components of crop, trees outside forest plantations, livestock, rural households, industry or trade within the village system boundary. An integrated approach using field, ancillary, GIS and high resolution IRS-P6 Resourcesat-2 LISS IV data is adopted for generation of various model inputs. The primary and secondary field data collection of various energy uses at household and village level were carried out using structured schedules and questionnaires. High resolution multi-temporal Resourcesat-2 LISS IV data (2013–14) was used for generating landuse/landcover maps and estimation of above-ground Trees Outside Forests phytomass. The model inputs were converted to energy equivalents using country-specific energy conversion factors. A comprehensive geotagged database of sampled households and available resources at each study site was also developed in ArcGIS framework. Across the study sites, the estimated net energy balance ranged from –18.8 Terra Joules (TJ) in a high energy consuming Hodka village, Gujarat to 224.7 TJ in an agriculture, aquaculture and plantation intensive Kollaparru village, Andhra Pradesh. The results indicate that the net energy balance of a Rural Ecosystem is largely driven by primary production through crops and natural vegetation. This study provides a significant insight to policy relevant recommendations for Energy Sustainable Rural India.

[Conference Paper](#) (PDF, 1633 KB)

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