



Traditional Fire Management in *Imperata* Grassland As A Tool for its Sustainability

KEYWORDS

Fire management, *Imperata* grassland, Barak Valley

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ABSTRACT *The traditional knowledge of use of fire as a tool for Imperata grassland management in rural landscapes of Barak Valley was documented. Imperata grassland is an important land use in the Valley with its special social value as thatching material for traditional houses in rural society. Harvesting, felling other vegetations to make a pure Imperata stand, fire breaks to hinder fire to spread, controlled fire practices, tillages- are the foremost strategies included in the traditional management system adopted by the micro scale growers of Imperata grassland.*

Introduction

There are innumerable references enduring fire as a pronounced management tool for grassland ecosystem of tropical countries. Fire prevents or slows down the natural succession to shrubs and secondary forest vegetation. *Imperata* grasslands are found dominant in areas where annual bush fires are common (Garrity et al. 1997). The *Imperata* grasslands of tropical Asia are a vast underutilized natural resource of common occurrence in most countries (Garrity et al. 1997). Such grasslands occur widely in the humid tropics on various soil types (Menz et al. 1998; Santoso et al. 1996). The area of *Imperata* grasslands in Asia is about 35 million ha, corresponding to approximately 20% of its total grassland area. The countries with the largest area of these grasslands are Indonesia (8.5 million ha) and India (8 million ha) (Garrity et al. 1997).

Most studies reveals about its distributions, area, species composition, biomass, productivity and typology (Ramakrishnan & Ram 1998, Astapati & Das 2010) and little attention paid on management aspect and there is no report on the traditional management system of *Imperata* grassland at rural landscape level. Micro scale or smallholder *Imperata* grasslands can be coined as the small patches of *Imperata* invested at individual level on rural landscape areas. Occurrence of micro scale grassland is attributed to conversion of macro (inter village *Imperata* grasslands) and meso scale (intra-village *Imperata* patches) grasslands to other land-uses (Garrity et al. 1997). The decline is also attributed to lack of commercialization of the resources. Literatures indicate *Imperata* as bioresource for utilization many fold either as thatch material (Astapati & Das 2010) and medicinal plant (Sherley 2010) or soil stabilizer and bio-carbon sequester (Yonekura et al. 2010). Irrespective of its diverse potentiality especially in rural socio-economy, these grasslands could not attract the attention of researcher. *Imperata* grasslands of North Eastern India are formed after abandoning cultivation and maintained under the influence of fire. In the present study area micro scale grasslands are being managed by about 7-10% of the householders since long time. Over the period they have developed the traditional knowledge of grassland management for its long term utilization. Therefore an effort has been made to document this traditional knowledge base system behind the sustainability of the micro-scale grassland.

Materials and methods

Study area

Present study was conducted in Rosekandy, Shahpur, Dargakona and Loharbond villages of Cachar district of Assam.

Cachar is the largest district of Barak Valley, Assam and *Imperata* grassland constitute an important land use. The climate of the area is subtropical warm and humid with average rainfall of 2226 mm, most of which is received during the Southwest monsoon season (May to September) and average maximum and minimum temperatures are 30.5°C and 20.3°C respectively.

Methods of study

Schedule questionnaire method was followed to document traditional knowledge of *Imperata* management. Fifty villagers from villages viz. Rosekandy, Shahpur, Dargakona and Loharbond of Cachar district Assam having *Imperata* grasslands were interviewed for the purpose. Field observations were also made to validate the responses of the villagers.

Results and discussion

Traditional *Imperata* grassland management—

Over the time period, rural people in Cachar district of Assam have developed strategies to manage the *Imperata* grasslands traditionally. These grasslands locally named as Son bari are confined at micro scale grasslands being managed at individual level. Harvesting, felling other vegetations, fire breaks, controlled fire practices, tillages- are the foremost management tools included in the traditional management system of *Imperata* grassland (Fig. 1).

Harvesting:

During the winter season when the growth is retarded, cultivars harvest *Imperata* grasses once in a year. In the month of February, the grasses are slashed and are bundled in bunches with diameter about 20-25 cm. The harvested *Imperata* are stored to thatch the small growers' houses and the surplus is sold in the market by the growers. According to the villagers *Imperata* houses with natural cooling process in very hot summer are very comfortable.

Felling other vegetation:

Usually other herbs, shrubs or trees are observed to grow scattered on the *Imperata* field. After harvesting the *Imperata* grasses, the cultivars cut down the unwanted vegetations and kept it on the floor to dry up.

Fire breaks:

Fire break is an unavoidable strategy to hinder risk from spreading of fire that is included as an important custom by the rural people in management of *Imperata* grasslands. Three kinds of fire breaks have been developed to uphold the purpose.

1. Before setting a farm land on fire, verdant on adjoining areas of the grassland are removed to obstruct spreading of fire.
2. Practitioners make small ditches that borders around the micro farm scale. These ditches work as a fire barrier between fired-land and other land uses.
3. The outskirts of the grasslands are irrigated one day before firing and it helps in controlling the fire to spread on its adjacent areas.

Controlled fire practice:

After the few weeks of clearing the lands from all types of vegetation, the dried remained plant parts with all the debris on the floor are fired accordingly with desired precautionary measures i.e. fire breaks. The controlled fire management is practiced each year during dry season in the month of February - March before precipitation. Fires on *Imperata* grassland might kill most other vegetation, but *Imperata* itself survives as fire can only kill above ground parts of *Imperata* but not affect the ability of rhizomes to re-sprout after fire. *Imperata* thus has the ability to survive fire and it competes effectively with other vegetation in open areas (Wibowo et al. 1997). Charred materials produced through the management efforts nourish the soil with nutrients and help in vigorous regeneration of *Imperata* on the next growing season. Charred materials contribute to soil carbon storage and provide nutrients for better growth of the vegetation (Preston & Schmidt 2006).

Tillage:

The traditional management of the *Imperata* grassland includes ploughing of the land once at intervals of 10-12 years. After 10-12 years, the soil becomes too compact to support re-sprouting of *Imperata* rhizomes. That is the reason behind for long gap period between two subsequent tillages. The traditional tillage system employed by the growers is a conservational tillage system which has its ecological implications in reducing the CO₂ emission from soil whereas in conventional tillage system, the land is ploughed every year causing CO₂ release from soil (Lal 2004). As soon as the monsoon arrives, *Imperata* starts regrowing from its preexisting rhizomes. The growth is continued till the post monsoon period retarding it in winter.

Conclusion

Micro-scale *Imperata* grasslands are inevitable to the rural dwellers of Barak Valley for its thatching function in traditional houses. There is a need of conservation and promotion of this bio-resource through the traditional practice of fire management due to its role in rural socio-economy and other environmental services. *Imperata* farming can further strengthen the rural socioeconomy if commercialized through development of *Imperata* based entrepreneurs among the micro-scale growers.

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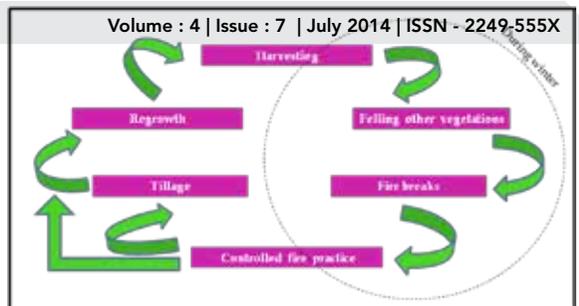


Fig. 1- Traditional management tools of *Imperata* grassland

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