

CONSERVATION AND MANAGEMENT OF FOREST RESOURCES IN INDIA : A PERSPECTIVES

Dr. B.C. Das¹, Dr. Sabita Kumari Sahu², Lopamudra Swain³

Reader in Philosophy (Retd.)¹

HOD, Dept. of Chemistry, Science College (Autonomous) Hinjilicut²

M.A.(Pol.Sc.), Research Scholar³

E-Mail : charan.baishnav@gmail.com¹

E-Mail : sahu.sabita26@gmail.com²

ABSTRACT

This paper brings out the issues related to natural resource exists, management and erosion right from the ancient to modern era. The natural resource such as forests and forest products were found as a basic source of survival for living organisms during the initial period. Later, the natural resources started degrading slowly and steadily due to increased human activities. In the beginning, natural resources were the primary assets for the growth of agriculture, industry, urbanisation etc. Subsequently, increased anthropogenic activities started degrading the forest cover on a large scale through extending the agricultural land scope and other developmental activities in the country. The importance of traditional knowledge regarding resource conservation, protection of sacred grooves, endangered species etc. started declining in modern India. Innovativeness and policy framework for resource conservation and utilization became unfriendly in addition to gradual decline to community management.

The key findings of the study point to major gaps existing such as between line departments and institutions in the promotion and management of forests, human welfare, agriculture, animal husbandry etc. Moreover, people tend to be more inclined towards the utilization of natural resources rather than conservation. From an observational and practical point of view, the natural resource has been declining rapidly in India. Therefore, this study strongly suggests that a due attention be directed towards developing people-friendly and environment friendly conservation strategies.

Key words : conservation, management, resources, human activities, survival, endangered species

INTRODUCTION :

Biological diversity that is seen today is the result of millions of years of evolutionary process. Diversity is measured in terms of genetic (diversity

within the species), species diversity (diversity at species level), and ecosystem diversity. Conservation of Biological diversity is essential in order to sustain the life of human beings as well as other forms of life..

The management of Natural Resources is a scientific approach for utilization and conservation of land, water bodies, soil systems, plants and animals to enable the people to fulfill the requirement so that along with the present generation the future generations would also be benefited. Therefore, the management of natural resources is combination of scientific and technical understanding of the same. This study mainly focuses on conservation and management of forest resources in India.

Considering that the indigenous communities happen to be the holders and carriers of traditional ecological knowledge and wisdom regarding the use and management of natural resources, their active participation in the various biodiversity programmes is absolutely essential to ensuring their sustainability and cost-effectiveness.

Habitat destruction is identified as the main threat to biodiversity conservation. Under diverse natural conditions, over a billion people in rural and urban areas live in harmony under a democratic system in India. However, their pressing needs of food, fibre, shelter, fuel and fodder combined with a compelling need for economic development exert an enormous pressure on the natural resources and the resultant loss and fragmentation of natural habitats affect all animal and plant species. Therefore, it is imperative to prevent not only any further habitat loss in the immediate future, but also to restore a substantial fraction of the wilderness that has been lost in the past.

The predominant causes behind the decreasing of forest wealth are over-exploitation, overgrazing, illegal encroachments, unsustainable practices, forest fires, and environment-unfriendly development projects in the forest areas. The collection of forest products including fuel wood, timber etc, are observed to be much beyond the regenerative capacity of our forests [7]

An ever expanding population pressure, poverty and a weak institutional framework have often been viewed as the predominant causes underlying deforestation and degradation in the developing and developed countries Table 2 and Table 3. An ever growing human and livestock population and the dependence on the forest products essential for sustenance and development invariably exert enormous pressures on the forest resources like fuel wood, fodder, timber, paper, etc., which, in turn, trigger an irreversible deforestation process.

The over exploitation of forest resources as compared to its incremental and regenerative capacities tends to

escalate the forest depletion and degradation process. At present the human population exceeded 7 billion which is growing every second.

The sheer force of our population where the human species is the dominant factor affecting land, air, water, soil, and species. In fact, an excessive deforestation has impacted not only the local environment, but also the global environment as also the socio-economic and development processes in the developing countries as forests generate a lot of employment opportunities in the primary, secondary, and tertiary sectors besides being a source of subsistence for the poorest of poor in the agricultural economies [7].

Table 1. Forest cover across the World from 1990-2010.
Source: http://www.earth-policy.org/indicators/C56/forests_2012 (Accessed 19.03.2015)

Region	Total forest cover (in MHa)			Change (in MHa)
	1990	2000	2010	
Africa	749	709	674	-75
Asia	576	570	593	17
Europe	989	998	1005	16
North and Central America	708	705	705	-3
Oceania	199	198	191	-8
South America	946	904	864	-82
World	4168	4085	4033	-135

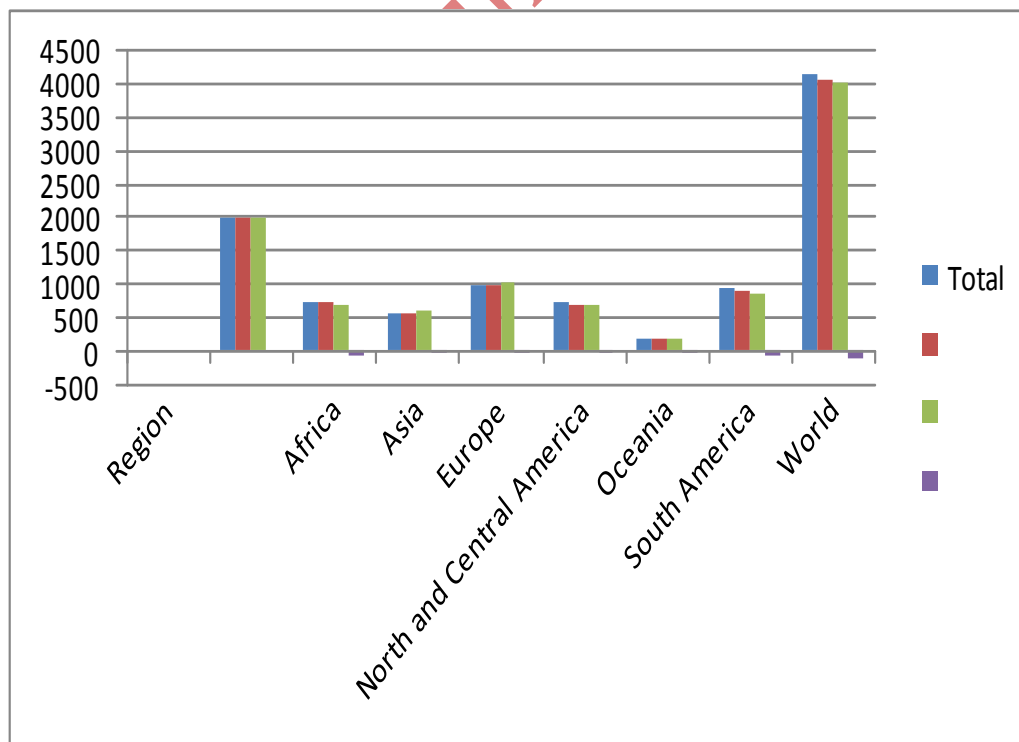


Fig. 1 : Shows forest covers across the world from 1990-2010

RESULT & DISCUSSIONS :

1. An Empirical Analysis Undertaken across the Eastern Ghats of India

The Eastern Ghats (EG), region a valuable natural resource pool of the country, plays a crucial role in shaping the topography, climate pattern and the environmental system of the nation besides serving as a living laboratory of biodiversity. Several ecosystems within the Eastern Ghats landscape play a major role in connecting the ridge between the Western Ghats and Eastern Ghats, the two important flora and fauna regions of the country. Thus, the Eastern Ghats landscape is important not only for the people and biodiversity of the region, but also the social and ecological systems of the low lying areas as ecosystem services that flow from WG provide sustainability to the low landscapes of the entire peninsular India. Human beings derive many useful benefits from the existing biodiversity and it is a well known fact that a large number of people, directly or indirectly continuous to depend on forest resources for their livelihoods. Keeping in view the ever increasing population and an actual decrease in the forest areas, the Indian Government allocates funds under the special Central Assistance (SCA) and Hilly Areas Development Programme for conserving the improving the present Eastern Ghats in Karnataka and other states. This programme, initially started during the Fifth Five Year Plan (1974-79), is still continuing. Across various plant

periods, the focus of the program has varied. During the sixth plant, the watershed development programme was taken up, keeping in view the significant of ecological restoration and conservation of biodiversity of the region. Later, during the eight five year plan, an integrated approach towards watershed development was initiated, while during the Ninth Five Year Plan, a greater emphasis was given to awareness creation, maintenance, preservation and restoration of biological diversity. Further, during the Tenth Five year Plan, the emphasis was on the preservation of biodiversity and rejuvenation of the hill ecology with an equal emphasis given to economic activities and livelihood security of the inhabitants under the environmental conservation programme. The major conservation activities are depicted in Table -5.

2. Green Cover Management :

The implementation of forest schemes such as agroforestry, social forestry and other forest activities is the second largest and important scheme under WGDP in Karnataka. The department of watershed in each district concerned executes monitor forestry works. Assistant Conservator of Forests (ACF) is the implementing officer in the Watershed Department and works under the guidance of District Watershed Development Officer (DWDO). Under this programme, the department raises plantations in the designed watershed areas and distributes seedlings to farmers to be planted in their farmyards and homestead lands.

Table-5 : Conservation approaches for Western Ghats development.

Agriculture & Soil Conservation works	The main objective of this scheme is to undertake soil conservation measures in watershed areas, and the activities covered under this scheme, include land development activities like leveling, bench terracing, land reshaping, amalgamation of paddy fields, land reclamation and contour bonding for increasing fertility and productive potential of agricultural fields; Water harvesting and erosion prevention structures like check dams, vented dams, nala bonding, boulder bunds and gully checks, diversion channels, filter strips for regulating the flow of water and diverting excess water.
Forestry	This scheme focuses on conservation, preservation and development of biodiversity in the watershed area; activities under this scheme include the development of forest nurseries, conversion of grazing lands into forested areas; Planting of tree species on either side of roads, Mangroves cultivation, Planting of tree species like bamboo, azardecta indica etc on farm land bunds; Protection of forest areas and planting of tree species for green manure and a forestation.
Agro forestry/Social Forestry	This scheme aims at raising plantations in the beneficiaries land holdings coming under the watershed programme with a view to meeting the growing demand for timber, fuel, wood fodder etc., thereby reducing the pressure on the forest area. Planting of nurseries along roadsides, river and canal banks and on the village common lands comes under this scheme.
Spice Board	This scheme includes the distribution of I.P sets, sprinkler sets, construction of farm ponds and gravity irrigation in the beneficiaries lands coming under the watershed area.
Horticulture	The scheme serves the purpose of converting waste land into horticultural plots and adoption of rain fed crops on dry lands; taking up inter and mixed cropping activities.
Foot bridges/Hanging, Bridges/vented dam-cum-foot bridges/PRED	The objective of this scheme is to provide rural connectivity to small habitations of Western Ghats. Under this scheme roads and foot bridges are provided for the people residing in the steep hilly terrains, (the Western Ghats region).

Livelihood activities for asset-less persons	
Animal husbandry, Supply of Giriraja, birds/calves/Development of small animals, Supply of Sewing machines/Masonry, Fodder, Carpentry kits/Kitchen garden Animal health camp/ Fodder development	This scheme includes development programmes for landless farmers coming under the watershed programine like artificial insemination for upgrading cattle, fodder cultivation on plots or farm lands, supply of carpentry kits and many other household kits for landless farmers; conducting of animal health camps and supplying of birds for the beneficiaries.
Livestock management including Goatry, Piggery.	Income generating activities for landless farmers—development of piggery and Goatry for meat and fibre.
Production system & micro enterprises	
Crop diversification, crop demonstration, Nutrition management/Organic fertiliser etc.	Demonstration regarding crop diversification is given to the beneficiaries in their own lands. Demonstration classes are conducted for generating awareness regarding benefits associated with and using organic fertilizers rather than synthetic fertilizers.

The department raises saplings which are suitable for the local environment and plant the same accordingly for the prescribed year. Under this scheme, the department considers both public and private lands and supplies seedlings/plants to beneficiaries free of cost. The benefits accruing from the plantations during the harvest period are shared by farmers equitably. Views of the villagers/beneficiaries are taken into consideration by the department officials prior to planting in the watershed areas and public lands and are mainly done on bunds and banks of streams and rivers for arresting rain water and also for avoiding runoffs. More importantly, it is the forestry related activities that mainly characterize the ecological restoration besides facilitating development.

3. Critical Empirical Field Observations :

The analysis highlights the schemes and programmes that are performing well and also the ones which are not. There are some schemes which need very innovative methods of implementation so as to be more effective, while some others need to be re-worked in terms of their focus and resource allocation. There is also an urgent need for a change in the approach and attitude on the part of the forest department towards the local communities as well as the programmes and schemes keeping in view the significance of community participation. Although there have been attempts made from time to time to involve the local communities in many of the programmes like Special Development Plan, Greening of Urban Areas, Eco tourism, Raising of seedlings for public distribution, Development of degraded forest etc, the extent of their active participation leaves much to be desired. It is important to note that Participatory approaches for resource governance have proved to be effective in terms of yielding favorable results such as halting the degradation of environment in different parts of the world. An

important issue which needs to be addressed is the burgeoning of the staffs at higher levels and the reverence of it at lower levels.

4. Man, Animal and National Parks :

National Parks are rich in biodiversity and wild animal Species. There are two major issues related to the wildlife division; 1) Man-animal conflict; 2) Habitat improvement of these two issues, man-animal conflict is the major one because, a majority of the people (75%) of the region have a negative attitude towards the park.

However the forest department has taken up some major, steps towards reducing man-animal conflicts' by putting up a solar fencing around the forest boundary and also by digging up deep trenches to stop the movement of animals into farm fields.

The compensation amount given to farmers constitutes 1/10th of their loss caused by wild animals, even as the forest officers feel that the compensation amount should be increased to 1/3rd of the total cost incurred and that the timely release of such funds is necessary.

5. Issues That Need to Focus :

There seems to be no proper cooperation and co-ordination between the forest department and other line departments with regard to forest management. The research wing of the forest department, is weak and hence, it should associate with other research organizations for better outputs. The policy implementation should be region-specific with a better recruitment policy at all levels. As there are more personnel at the top and few at the ground level there is no balance observed in the execution of work. The critical suggestion based on observations includes the following and management process:

- 1) Quality Planting Material (QPM) should be planted.
- 2) Accountability and Transparency should be ensured at various levels.
- 3) Proper maintenance is required.
- 4) Computerization of records is essential.
- 5) Global Position System (GPS) should take a keen interest in monitoring the works handed over by the forest department.
- 6) There should be no irregular release of funds that affects the plantation activities right from germination to seedling transplantation stages.
- 7) For pre-monsoon period, activities like nursery development might be a problem due to irregular release of funds which can be avoided.
- 8) There is no timely tender process in place.
- 9) Inadequate staff at the field level.
- 10) The department should encourage villagers to form VFCs and the watchers should work under the guidance of VFCs.
- 11) Basic information should be given for forming VFCs, like how to conduct meetings, who should be involved in meetings and training programmes and benefits of forming VFCs.
- 12) Trainings should be given to villagers and VFCs regarding conservation and management of forest or plantations.
- 13) Protection should be provided by a committee consisting of members from the forest department and villages.

6. Need to Rethink Policies with Regard to Development of Protected Areas :

Various studies support conservation oriented policies in respect of the protected areas as they constitute cornerstones in conserving biodiversity [8]-[11]. However, some significant research studies point out that a further debate is required concerning the process and relevance of establishing protected areas which tend to demean human existence [12]-[15]. A variety of external driving factors including climate change, have brought about a shift in terms of social and ecological processes across the landscapes protected for biodiversity conservation [11] [16]. Further, in view of the fact that these changing socio-economic and ecological processes are more visible in the protected areas Figure 4, it is necessary that agencies, managers, policy makers, scientists and the public do a rethink in terms of devising innovative policy responses for

biodiversity conservation and sustainable socio-economic development. This is especially important in respect of the protected areas where people have been living in harmony with nature for centuries.

Thus, for effective implementation of the conservation policies, scientific and technological research should support the policy making processes. When science and policy differ, the outcome, in the form of communication, is often problematic [16]. The requirement is—that the scientific information is as per the requirements of policy demand and that it is easily accessible to policy makers and decision takers. On the other, policy makers and decision takers should formulate appropriate policy responses in such a way that it is easily understandable for researchers so as to be able to provide available scientific information based on their deliberations [17]. This approach could help evolve effective science-policy responses for protected area management (*i.e.* in terms of impact, causes, effects, adaptation, conservation and management of biodiversity) at local, regional, national and international levels.

7. Contemporary Approaches for Resource Management :

The growing global concern for the conservation of natural resources has resulted in the formulation of long-term perspective plans. Forest resources facilitate the maintenance of ecological balance, biodiversity, enhancement of the quality of environment by checking soil erosion, water retention and conservation, regulation of water cycle, acting as carbon sinks which balance carbon dioxide and oxygen in the atmosphere and the greenhouse gas effects, etc.

Biodiversity and ecosystems are a natural basis ensuring sustainable resource use, including forestry, farms, renewable energy, urban land use, fisheries and other coastal & marine resources [17]. There has been a growing awareness of the business impacts of biodiversity loss and degradation of ecosystems. Conservation measures that combine land development, land conservation, and revenue generation provide a functional protection for conserving resources. Further, conservation projects are created through a process of ecologically based planning and design, whereby planners assess a site's natural resources and environmental context and use this knowledge for conserving portions of the site with a high resource value while designing a development process that minimizes the environmental negative externalities [18].

Although conservation oriented projects appear to have a fair potential for protecting biodiversity and ecosystem services, there have been few attempts made to evaluate their actual conservation benefits. In practice, the success of such conservation projects is typically measured in terms of the percentage of the total site area

set aside as a protected land, but this indicator does not explain whether a given site's conservation values are being protected functionally. Therefore, it is argued that traditional knowledge is very crucial to contemporary natural resource management and conservation.

8. Socio-economic Implications :

The development of the local economy, while managing Common Pool Resources (CPRs), has become an integral part of the sustainable development policy in many of the developing countries over the past few years [19]. This initiative has emerged largely due to a strong realization of disillusionment with the performance of the centralized management policy in terms of providing sufficient incentives to the resource users for managing the local resources on a sustainable basis. Participatory resource management is often seen as an appropriate solution to reducing rural poverty and resource degradation, while granting community property rights over the local level natural resources would ensure an equitable and sustainable use of environmental resources [19]. More precisely, when the responsibility of allocating natural resources for conservation is delegated to local organizations, communities tend to use these resources for the collective welfare of the community.

Poverty, property rights and the distributive consequences of community-based resource management are becoming increasingly a major subject of discourse with respect to the local level collective action. A long held perception is that common property resource appropriators can create and sustain the local management institutions for ensuring an equitable access to, and income from resource management. Further, CPR related literature claims that since poor people are heavily dependent on natural resources, they derive higher incomes from CPRs [19]. More importantly, there is a less, attention given to the fact that a mere institutional change of resource management might not help certain sections of the community, especially the poor and marginalized people, as they are often the most vulnerable sections of the community. i

9. Innovativeness towards Resource Conservation :

An innovative community is not one founded to produce and distribute products invented by a single individual. An innovative community has the means to stimulate, nurture and develop innovation among its people. The lessons learned from open-source development can be transferred to other existing innovative user communities of physical products as well. Farmers in the developing countries possess quite a sophisticated knowledge of agriculture and natural resource management which is recognized as being more eco-friendly and sustainable. Indigenous Knowledge (IK) is dynamic, in terms of changing mechanisms of

creativity and innovativeness and contact with other local through international knowledge systems. Indigenous Knowledge Systems (IKS) may appear simple to an outsider, but they represent mechanisms that ensure the minimal livelihoods for the local people mainly because the structure and content of traditional knowledge are intimately linked to the local bio-resources and ecosystems [20].

Most natural-resource planners recognize genetic diversity and its underlying processes as essential components of an ecosystem and species stability, adaptability and conservation, but there is rarely an explicit provision for the conservation of genetic diversity in management planning and decision-making [21]. The conservation of genetic diversity is essential for many reasons. Given the current worldwide pervasiveness of habitat fragmentation, integrating the conservation of essential ecosystem processes with human population needs is urgent [21]. There is a need for promoting social and economic infrastructure development to realize the potential benefits of the market economy, under natural resource policies that incorporate the environment as well as local people's rights and economies. There is a need for reforming and strengthening of forest governance and the forest-sector by way of ensuring a sustainable forest resource use and forest conservation through promoting modern scientific approaches. Because, forest development with a mere industrial emphasis and a narrow-minded resource use, can further weaken the connection between local people and forests.

While every site is unique, challenges involved in managing the same tend to differ from country to country and even region to region or site to site [22]. Social and ecological dynamics and the human dependence on the capacity of ecosystems in terms of generating essential services and the vast importance of ecological feedbacks for social development, suggest an interconnection between social and ecological systems. A social system includes economy, actors and institutions in mutual interactions [22]. More importantly, power, politics, knowledge, social differentiation, economic development, livelihood quality (often understood as both social and environmental), and ecological resilience have emerged of late particularly salient aspects of human-environmental issues.

10. The Need: Integrated Natural Resource Management Policy :

The need of the hour and a possible solution, particularly in view of a possible threat looming large over the future generation, is to think of natural resources as one integrated piece of asset on this planet. These resources should be governed by uniform use policy, be it land, water or air or even forest or minerals. In fact,

natural resource management with conservation and resource enhancement and preservation and pollution abatement as its primary goals, should be the focus of a new set of policies by the government. An integrated natural resource management policy can be a directive principle underlying the policy for states to administer with various departments and the Centre to monitor and evaluate the programmes. An umbrella legislation like the well-drafted EPA (Environmental Protection Act) 1986, can go a long way in making a thematic conservation strategy for resource utilization and regeneration possible. People need to be the focus of any such policy [23].

Fundamental changes, necessary for preventing a large scale destruction of the nations (and the world's) natural resources, can occur only if people could enjoy greater incentives so as to be able to rethink and reform their behavior towards the environment [23].

The failure to view natural resources and the environment as one whole entity can have far reaching adverse consequences. Ecology entails an interrelated existence of living beings and natural resources with environmental justice as the touching stone of resource conservation. Considering that resource conservation is a necessary condition for ensuring environmental justice, reorienting the legal regime towards this goal becomes significant in terms of policy and effects. The inter-linkage between water (jal), soil (jameen) and forest (jungle), calls for a long-term plan for developing forests, stopping the expansion of deserts, conserving soil fertility and nurturing groundwater through rain water harvesting, especially for meeting the challenges of droughts. The lack of integrated approaches and definitive standards in this sphere allows different statutory bodies to adopt different criteria and policies while exercising overlapping controls with communication gaps so as to escape public accountability through mutual accusations [23].

Unless conservation and preservation become the main aim of policy-making, environment in general and resources in face a possible threat of extinction. Nature as a harmoniously unified entity, cannot tolerate a proverbial situation of "too many cooks spoiling the broth" [24].

CONCLUSIONS :

This paper highlights the significance of natural resources and their utilization right from ancient to modern times in addition to an inalienable relationship between human beings and natural biodiversity. NRM refers to the management of natural resources such as land, water, soil, plants and animals, with a specific focus on how management affects the overall -quality of life. Indigenous people happen to be the carriers of ancestral knowledge and wisdom regarding biodiversity. Their active participation in biodiversity conservation

programs is essential for resource management to be more effective and cost-efficient.

Under diverse natural conditions, over a billion people in rural and urban areas live in harmony under a democratic system in India. However, the loss and fragmentation of natural habitats invariably affect all animal and plant species. The predominant causes underlying the declining forest cover are over-exploitation, overgrazing, encroachments, unsustainable practices, forest fires, and non eco-friendly development projects in the forested areas. Forest resources help protect ecological systems besides enhancing the quality of environment by way of controlling soil erosion and water retention. But, increasing population and commercial demand for wood have dented the natural forest cover nurtured by our ancestors.

Considering that local knowledge is no longer receiving its due attention in modern India, the loss of natural biodiversity has doubled with conservation becoming much more challenging. Along with science, local technologies and people's knowledge regarding ethno forestry have an important role to play in biodiversity conservation and sustainability. A balance between local and formal institutions can result in empowerment, security and opportunities for local people. Also equity of knowledge provides an opportunity for local people to participate in the management of local resources with global implications.

Conservation management is created through a process of ecologically based planning and design, whereby planners assess the state of natural resources in the environmental context and use their knowledge for conservation to minimize the environmental impacts.

Since ecology is all about an interrelated existence of living beings and natural resources, an integrated natural resource management policy can be an ideal directive principle of the State policy for states to administer and the Centre to monitor and evaluate.

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