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# Sustainability and Livelihoods

*Chinta Srinivas*

## Abstract

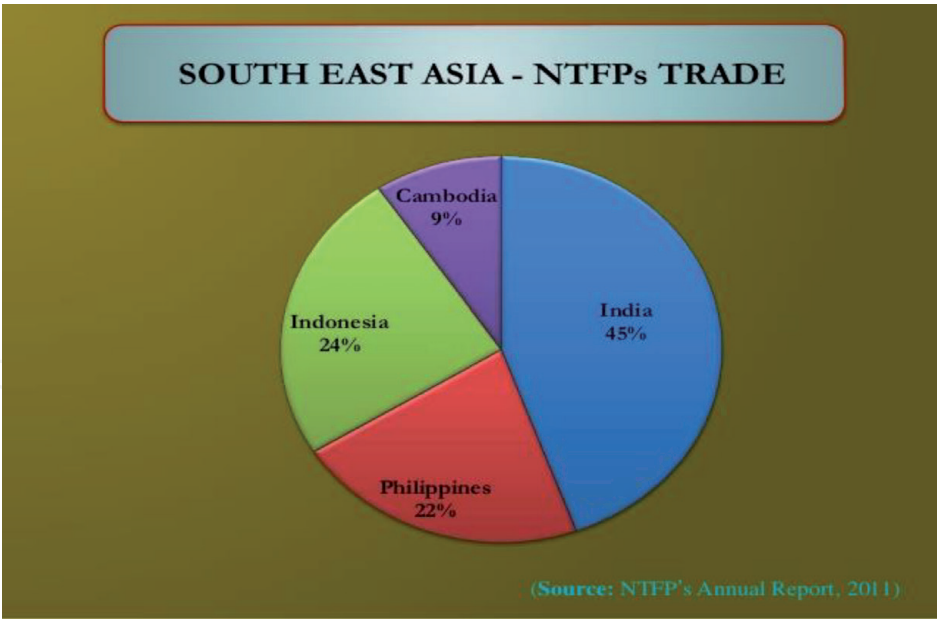
The word environmental sustainability of late has been used as catch word for illustrating the climate change and subsequent sequential impact of various aspects of environmental landscape that include soil management, gaseous exchange, nutrient cycling, carbon emission, rainfall etc., Interpretation of environmental changes are interpreted based on very few trends which need not necessarily cause short term or long term impacts. The impact assessment of a region fundamentally depends on region specific history of habitat management, human interference, agricultural practices, Economic livelihood activities which depend on available natural resources and seasonality of intensity of activities. In the present study efforts are made to indentify the major NTFP based livelihood economic activities and relate the habitat management aspects along with commercial invasion that became detrimental to environmental threshold to call for sustainability alarm. The livelihoods in various developing economies have different environmental impacts. Such assessment of economic activities have any real environmentally detrimental consequences or is it being essentially over emphasizing to create such fears have been analyzed.

**Keywords:** sustainability, ecology, non timber forest economic activities, threshold

## 1. Introduction

Rural economic development being the focal point of many of the developing economies all over the world, livelihood opportunities is an inseparable entity. Livelihoods comprise the capabilities, assets (including both material and social resources) and activities for means of living [1]. A Livelihood is well-defined as the events, assets and the admittance which together defines the living multiplied by a single individual or family [2]. The three essential elements of life i.e. food, shelter and clothing are to be sourced or earned by any human being for sustaining his life and his family members. Therefore all such activities that involves means of finding food, water, shelter, clothing for self and his dependants can be referred to as livelihoods.

United Nations Sustainability Goals are to be addressed of which goal ending everywhere in all forms we see poverty. Culmination of starvation, accomplishing food security and better-quality Nutrition in addition to support and uplift Sustainable agriculture. Safeguard, renovate and encourage sustainable usage of earthly networks, sustainably be able to manage forests, fight against desertification as well as converse land degradation and halt biodiversity loss are the major direct impactful goals that can be addressed while indirectly combat the other sustainable goals during this study. Various studies have been reported on livelihood and sustainability [3], defined livelihood as a wealth of attainment of living. United



**Figure 1.**  
*Proportion of NTFP trade among representative countries of South East Asia.*

Kingdom's Department of International Development (DFID) and the United States agency for International Development (USAID, 2005), more appropriately defines "Livelihoods are the means by which households obtain and maintain admittance to the possessions essential to ensure their immediate and long term survival". Approximately 90% of farming activities are carried by rural of rural families [4]. Whereas in Africa, 70% of income is achieved through farming activities. And in Asia and Latin America, 50% of the household income is achieved by farming [4]. Among these the rural populace practice fishery, livestock raising and also small-scale farming activities apart from these other non-farming activities for their survival and for source of income (**Figure 1**). Many studies are being carried through various angles on the livelihoods worldwide. The village studies tradition, dominated by economists, but not exclusively so, was an important, empirically-based alternatives to other economic analyses of rural situation [5]. In India, studies were made on diverse impacts of Green revolution [6, 7].

Studies on classic examination of rural change in Nigeria have been carried and also had studied the livelihood strategies in Zambia. Different people respond to changes in livelihoods differently, but the most common response seems to be that individuals and nations buoy their access to resources thus creating conditions for competition and conflict over those scare resources. The present paper enumerates the status of native population and various influencing factors in divergence ineffective sustainable development strategies compromising the livelihoods of indigenous people. This paper addresses the limitations of governmental imposition of laws and break-even point for co-existence of indigenous habitants to harness available resources for their own sustenance.

## 2. NTFP trade

Livelihoods while traversing over a long period has attained commercial proportions globally. Demand and supply determines the dynamics of production for example forest wood is estimated at 3469 million M3 in 2011, of which 1891Mn Cu.m is fuel wood and 1578 Mn cu.m is industrial round wood. Of the Forest fuel wood produced apart from consumption for domestic use, about 10 percent of

(115 Mn cu.m) is marketed internationally. Similarly of the 406 Mn cu.m sawn wood produced, 120 Mn cu.m internationally marketed throughout the world. Similarly such higher consumption patterns have been observed globally for various other forest products such as wood panels 288 Mn cu.m, of which 71 Mn cu.m is traded globally. Paper and Paperboard production out of 403 Mn cu.m of which 112 Mn cu.m was exported into global markets. Estimated value of \$ US 246 billion forest products are globally traded in 2011 FAO (FAOSTAT, 2013). Production of tropical industrial logs of round wood among ITTO member countries increased from 40.4 million m<sup>3</sup> in 2009 to 141.4 million m<sup>3</sup> in 2010, which dropped to 137.7 million m<sup>3</sup> in 2011. Indonesia, Brazil, India and Malaysia are the four major countries that accounted for almost three quarters of total production in 2010 and an estimated 63 percent of production was in the Asia Pacific, reduction of production by over 18% by Malaysia resulted in drastic decline in production [8]. It is also reported that Forestry & logging contributes to 1.2% of India's GDP (Economic Survey, Ministry of Finance, 2011). At the rate of 5.5 (CAGR) between 2007 and 2011 the Indian forest products industry had total revenue of \$65,844.6 million in 2011 similarly Consumption by industries in terms of volume, increased at the rate of CAGR of 0.2 percent between 2007–2011, to reach a total of 355.4 million cubic meters in 2011. Projection based on performance of the industry is to accelerate, with an anticipated CAGR of 7.7 percent for the five-year period 2011–2016, which is expected to value US \$ 95,467 million industry by the end of 2016. With the demand growth for forest based raw materials, resulting in drastic increase in harvest at a rate of CAGR of 5.5 percent calls for restraint and stricter forest policy and efforts to escalate sustainability to protect the livelihoods of generations to come while evolving strategies forest succession based on natural habitat supporting diverse products.

The trades between South East countries are given below as on 2011 (**Table 1**).

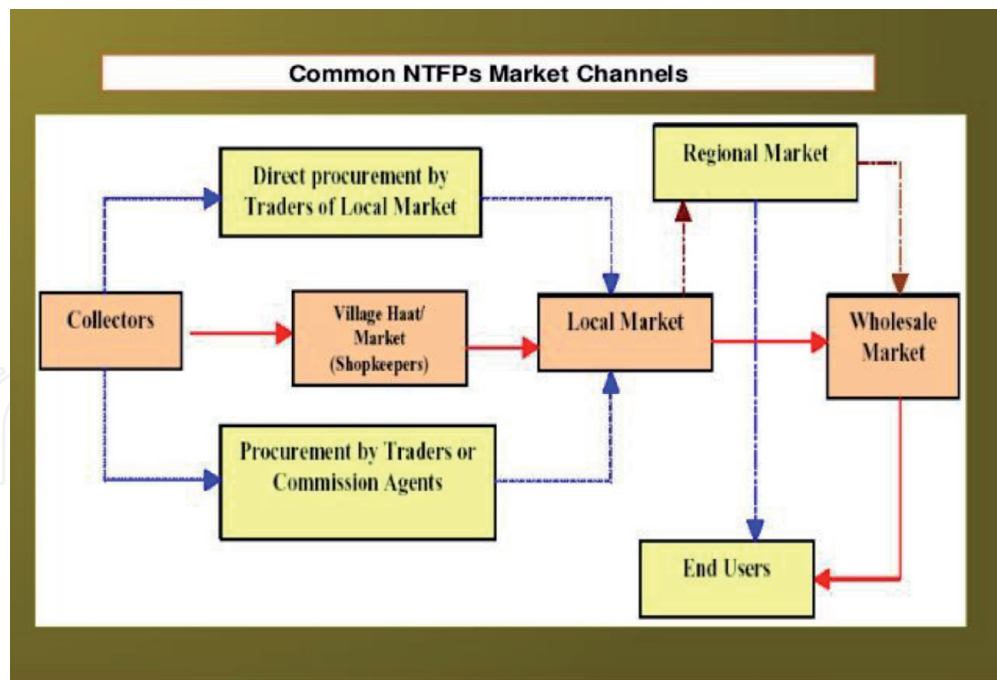
2.1 Supply chain of NTFP

The general pathways of supply chain of NTFP will illustrate the intricacies of each segment of raw material base. **Figure 2** depicts the schematic representation of supply chain of NTFP. Market access and strategic market interventions would determine the vertical and horizontal expansion of successful business enterprise. This can be achieved by facilitating through governmental interventions through its network of stakeholders and collaborating with national and international agencies as well as development projects [9, 10], however, demand for such forest based non-timber products will only be viable in which suitable initiatives would be beneficial

South – East Asia – NTFPs Trade				
Country	Number of enterprises	Number employed	Number of villages	Sales (in Euros)
India	27	2232	370	181594
Indonesia	29	1452	58	99838
Phillipines	64	1946	68	884178
Cambodia	38	7400	81	38344.2
Total	163	7400	600	408196

Source: NTFP'S ANNUAL REPORT 2011.

**Table 1.**  
*Comparative trade pattern among the south East Asian countries and their share in total NTFP trade.*



**Figure 2.**  
Schematic representation supply Chain of NTFP.

to the livelihoods of people who depend on such products. High demand is a pre-requisite for NTFP business establishment, as seen for instance for Tropical Tasar silkworm rearing on *Terminalia arjuna* trees and Temperate Tasar Silkworm rearing on *Quercus serrata* and *Quercus acutissima* or oak trees the cocoons of which are the raw material for silk industry in India, charcoal [11], brooms [12], amarula products [13] or agar oil. Renewed exerted pressure for demand often invites professional and intense marketing strategies, in particular for exceptionally innovative products introduced into international markets [14, 15], funds for which are frequently not freely available. Nevertheless, studies have demonstrated that demand potential for NTFP products can be considerable, with quality and environmental friendliness being the most important attributes [16, 17].

Business enterprises and projects based on NTFP business development models without considering the market consumption of product may fail since the increased supply of products cannot be absorbed, resulting in low prices of the products [10, 14, 18–21]. Markets and Prices being dynamic and volatile, NTFP products will have to face hurdles in gaining foothold many a times [18, 22, 23], like many other commercial products, market slump and boom-bust cycles, or the sudden hibernation and limited or few buyers [13, 14] under such conditions, small-scale producers should be skillfully equipped with product diversification options readily in place within the NTFP enterprises and forsake other income-generating opportunities [24].

Certain value chain setups have been demonstrated to fetch larger benefits for NTFP-processing enterprises. Short value chains are seen as beneficial, since the role of middlemen is restricted and producers can potentially obtain higher prices [1, 21, 25]. Furthermore, shorter chains may also ease implementation and control of standards [14]. The unorganized nature of NTFP becomes vulnerable to exploitative role of intermediaries, who misappropriate accrued benefits that have a cascading effect contributing towards poor marketing margins for producers has often been demonstrated [24, 26, 27]. However, lack of market information, poor infrastructure and financial constraints, intermediaries may sometimes be the only pathway for producers to market their products. The NTFP when takes the shape of



organized and structured system, the value chains with close cooperation among members are also commonly associated with economic benefits. Close networking and cooperation between collectors and processors might result in cost effectiveness and ensure that high-quality raw material is sourced through integrating modern technological interventions, for instance, via setup of collection centers, buyer–seller meets or pick-up events [1, 28]. With modern technologies of SMS services Market, product and prices are available on finger tips. Such information dissemination services and networking among NTFP collectors can also provide collectors with assured market openings [29] via contracts; linkage of producers of limited capacity to international markets with higher profitable prices would improve their income [14, 30]. Such mutually co-existing cooperative system may also occur via groups of informal social norms, integrating value added supply chain members together, and providing accrued benefits.

Though, partnership among value chain members should not be seen as a highly lucrative proposition, but are inter-dependant mutualism depends on the respective posturing. For example, small-scale producers may be limited in their financial flexibility that allow economic freedom and are relegated to disadvantageous position depending on the conditions existing or set [18]. Furthermore, they may be restricted with little elbow room to exhibit higher value addition without scope for value-added NTFP development, whereas groups further downstream may accrue higher profits [20]. The livelihoods thus sustained by means of the NTFP are to be used judiciously to uphold the balance of harvesting and regeneration of forest resources made available for consumption on its own over a period of time.

The increased rate of demand and supply increasing at the rate of 5.5% have implications on, the imminent danger of depletion of NTFP and its cascading effect on livelihoods and unemployment. The rights of livelihoods and employment are undermined of aboriginals or actual inhabitants of the forest areas. The sustainability backed by stringent forest laws has implicit political maneuvering to displace original inhabitants with settlers resulting in ethnic conflict as observed in north eastern India.

## **2.2 Aboriginals and livelihoods**

Forest deprivations as well as deforestation are serious threats to sustainable development; their exponential rate of growth poses a severe risk to the world's ecosystems. Forests are common property resources in many parts of the world. As [31] argued, open access to forests, without restriction, can be subjected to indiscriminate harvesting leading to degradation of forests. Various non-timber forest products (NTFPs) manufactures drive their operations in unbarred or with limited self-restraint access systems of resource occupancy, resulting in misuse of NTFPs [12]. Aimed at the imperishable harvest of NTFPs, land and resource occupancy are crucial [32] quick expansion of market of NTFP products with little or no proprietorship security leads to over-harvesting [33]. However, the institutional interventions, policies, and law enforcement at the various levels both at local and international strata could help reduce the cataclysm of multitudes [14] and lead to the judicious utilization of quotidian resources.

Millions of people who depend directly or indirectly on forests for their livelihoods or forest produces either entirely or partially along the entire segments of supply chain for either goods or service facilities at regional or international level will critically get affected due to forest degradation (FAO, 2011). The impact of forest degradation which result in reduced forest productivity which has a cascading detrimental effect on the livelihood of forest-dependent communities. The reasons for forest degradation often is attributed intricate complex interplay between forces of direct influences functioning at the local or provincial levels and ancillary

influencing forces functioning at the local, regional, national and international levels [7]. In general reasons for forest degradation is primarily attributed to interference of extreme anthropogenic factors in developing countries, while in developed countries natural events are usually the reasons for genesis of degradation (FAO, 2011). Fuel wood collection, charcoal making, and timber logging are the most severe problems fostering forest degradation in Africa and subtropical Asia, while timber logging and uncontrolled fires are the main drivers of degradation in Latin America [34, 35].

The main direct drivers of forest degradation in Myanmar are illegal logging, overexploitation of forest resources, fuel wood collection, and shifting cultivation [35]. Conventionally, the major contributing factor for forest degradation in Myanmar is attributed to excessive human infringement and exploitative activities, specifically the overexploitation of forest resources. However, very little is known about the reasons behind these activities driving forest degradation. It is of utmost importance to understand the degree of needs for survival of local population on forest resources of NTFPs and to recognize the contributing factors affecting this dependence. Reducing Emissions from Deforestation and Forest Degradation (REDD+) is an international voluntary mechanism under the United Nations Framework Convention on Climate Change (UNFCCC) designed to mitigate climate change by reducing greenhouse gases (GHG) emissions (UNFCCC Report, 2007).

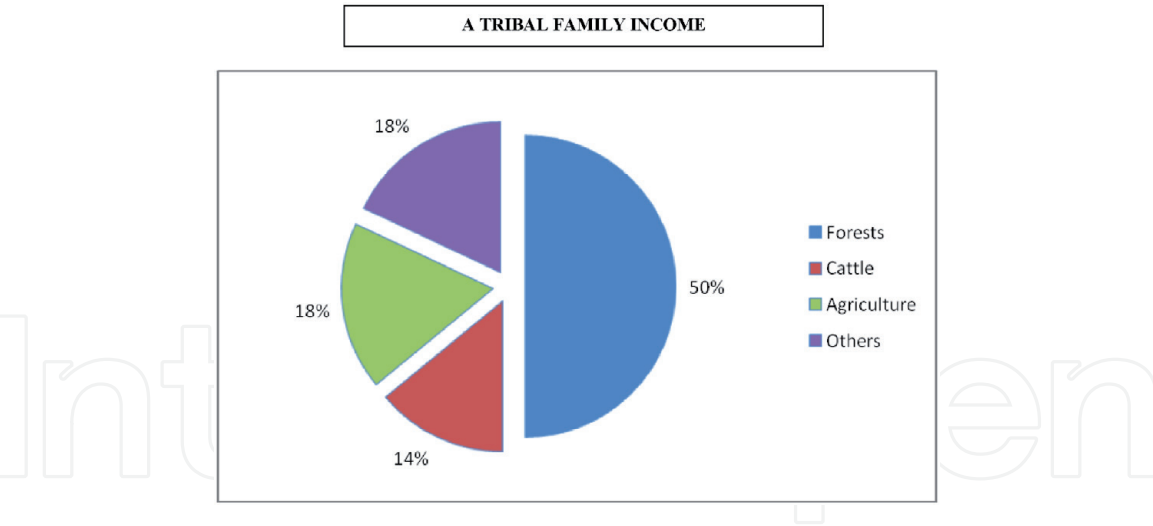
The influencing factors which are attributed to forest degradation as well as deforestation by considering both social and natural systems are at the fundamental base by understanding the underlying mechanisms behind the forces of forest degradation is imperative to achieve the UN sustainable development goals. Utilization of forest resources in excess resulting from over dependence of the communities are the causative attributes which mainly lead to forest degradation. Thus, by understanding influences of critical factors of survival on NTFPs would help blueprint and/or strategize to constitute to inscription on impediments on various characteristics by analyzing NTFPs for their livelihoods of such forest-dependent communities and their potential for developing policies and strategic interventions or measures (PAMs) that could mitigate in reducing forest degradation and restore or otherwise reestablish and improved forest management techniques. Policies measures thus enacted by countries undertake to address the grounds for deforestation and forest degradation nationally to mitigate the dangers of emerging environmental issues [32, 36]. Multipronged approach of in combinations of new policy and measures from different sources are required to collectively address priority issues confronting the region specific measures to implementation, in a coherent way [REDD+ Programme. 2018]. Depending on the country specific (i.e., priority, political preference, capacity, and stakeholders involved), policy measures may be a mixture of legal and institutional reforms, regulatory measures, and incentives taking social and environmental safeguards into account as well as capacity building [37]. Strategically South Asian countries need to ensure policy measures that address the priority drivers of forest degradation and deforestation and also to overcome the barriers to the sustainable management of forests (REDD+ Program. 2017). A balance needs to be made when Policy measures being contemplated, such as legal or regulatory reform need to be implemented at the national level while some should be implemented at the local level (REDD+ Programme, 2017). This present status underscores the need to further assess the fundamental rationale of depletion of forests and forest degradation and the dependency of local population on forest resources when the REDD+ plan is executed in a specific region. Strategies to reduce excessive exploitation of NTFPs, a policy structure could be evolved based on a close evaluation of the issues that affect aboriginal community dependent on Non-Timber Forest Products (NTFPs).

The term **Indigenous peoples**, besides recognized in some areas as **First peoples**, **First Nations**, **Aboriginal peoples** or **Native peoples** or **autochthonous peoples**, are ethnic groups who are the original or earliest known inhabitants of an area. Groups usually are described as indigenous when they practice and continue to practice same traditions or other characteristics of an initial culture that is associated with a designated region. Many indigenous people do not practice this characteristic, as most people have imbibed substantial components of a colonial culture, such as attires, religious beliefs or languages and dialects. Indigenous peoples may have adopted themselves in a given region (sedentary) or might have relocating lifestyle across a large territory, but they generally establish linkages to their ancestry by descent co-existing with a specific region on which they dwell. Indigenous societies are found in every inhabited climate zone and continent of the world where human settlements are known to exist. The inter-relationship of habitants and their means of living have been debated in many international forums and commissions. It was specified that four criterions must be fulfilled in order to qualify for aboriginal subsistence whaling as part of International Whaling Commission proceedings [35]. The descendant of the first known inhabitants of an area, be of any origin, be dominated politically by out-siders and depend on simple technologies without being properly involved in the world economy.

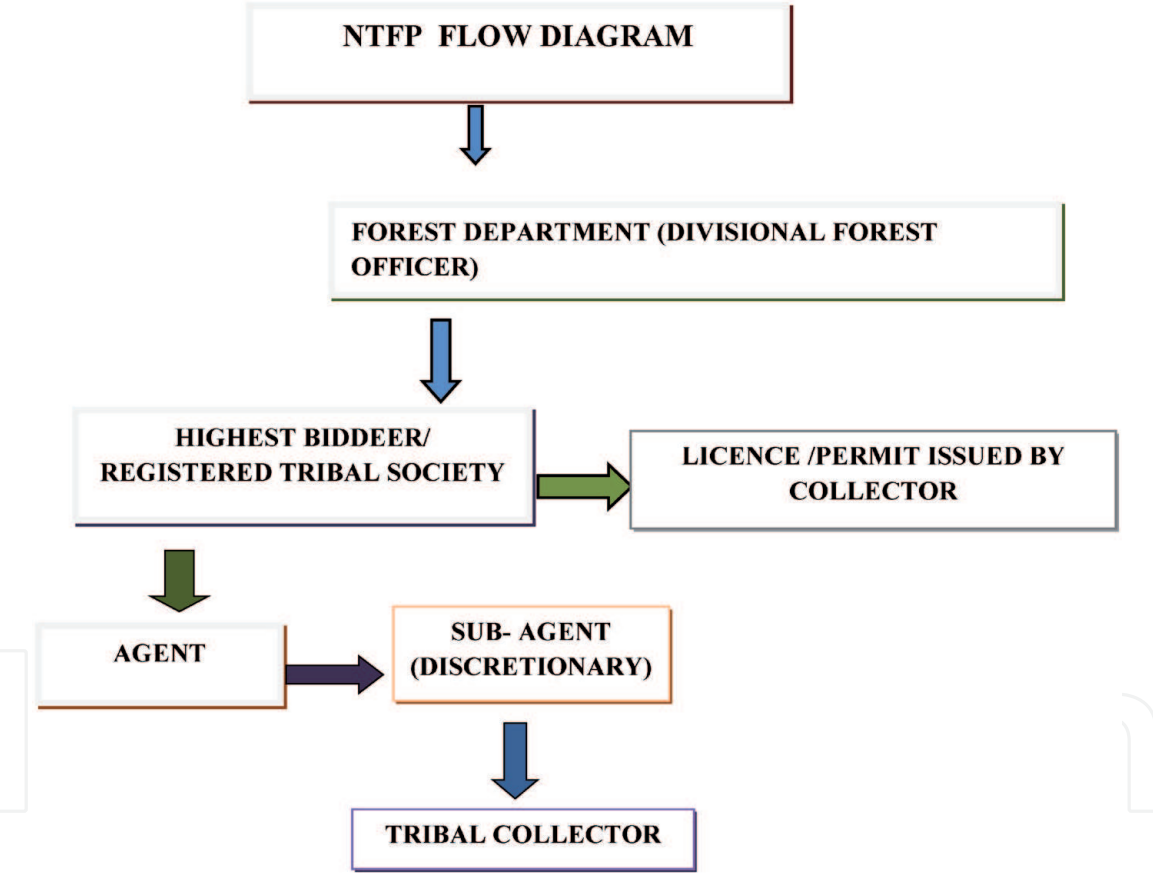
The studies and surveys conducted in the tribal areas of Chhattisgarh state of India where forest stands are utilized by the aboriginal population for their livings are conserved by means of apportioning the available resources for self sustenance and for small portion of the products for commercial purposes to earn money for their living. The sustainability concept is inherent in their life style and religiosity attached to the nature by the aboriginals has gone a long way in protecting their livelihoods as well as the produce that they depend on for their survival. Depicting and showcasing native people in scantily clad, feathers in their head gear in international events are the norms in several parts of the world forums. Such show casing of exhibits of indigenous people was important for NGOs "Fund Raising, Eco Factories, environmental activists in the name of eco-tourists are fundamentally thrusting their limited knowledge on locally solvable issues into politically and socially squeezable entities. The most aptly the phrase of [21] "Think Locally, Act Globally" is relevant to the present scenario for many developing economies where forest resources such as Amazonian, Australian, South African, Asian countries like India, Nepal, Vietnam and many more needs to adopt strategies to conserve the aboriginal evidence of people who are dependent on the indigenous resources. The focuses of development politics by colonial and post colonial governments have not only been economically unsuccessful more often than not, but they have also frequently been harmful to the environment. A schematic representation depicting different economic activities of Income generation in a tribal family is given in **Figure 3**.

More than 50% of the income generated in a tribal family is from Non-timber Forest Produce while Agriculture other employments contributes (18%) each and cattle breeding 14% respectively. In such a scenario, the value system for preservation and sustained production chain is inherent to the indigenous habitants of the region. Generally prevailing scheme of natural resources and operating mechanism worldwide is shown in the **Figure 4**. NTFP resources are under the control of government is managed through Forest Department by inviting highest bidder the harvesting rights permitted by the local government authority. The agents of bidder and sub – agents in turn assign the task to Tribal collector. The over harvesting and exploitation and chain of corruption initiated in the process becomes detrimental to the livelihoods of the local people as the commercial exploitation set in through this process resulting in pushing the indigenous and poor people to





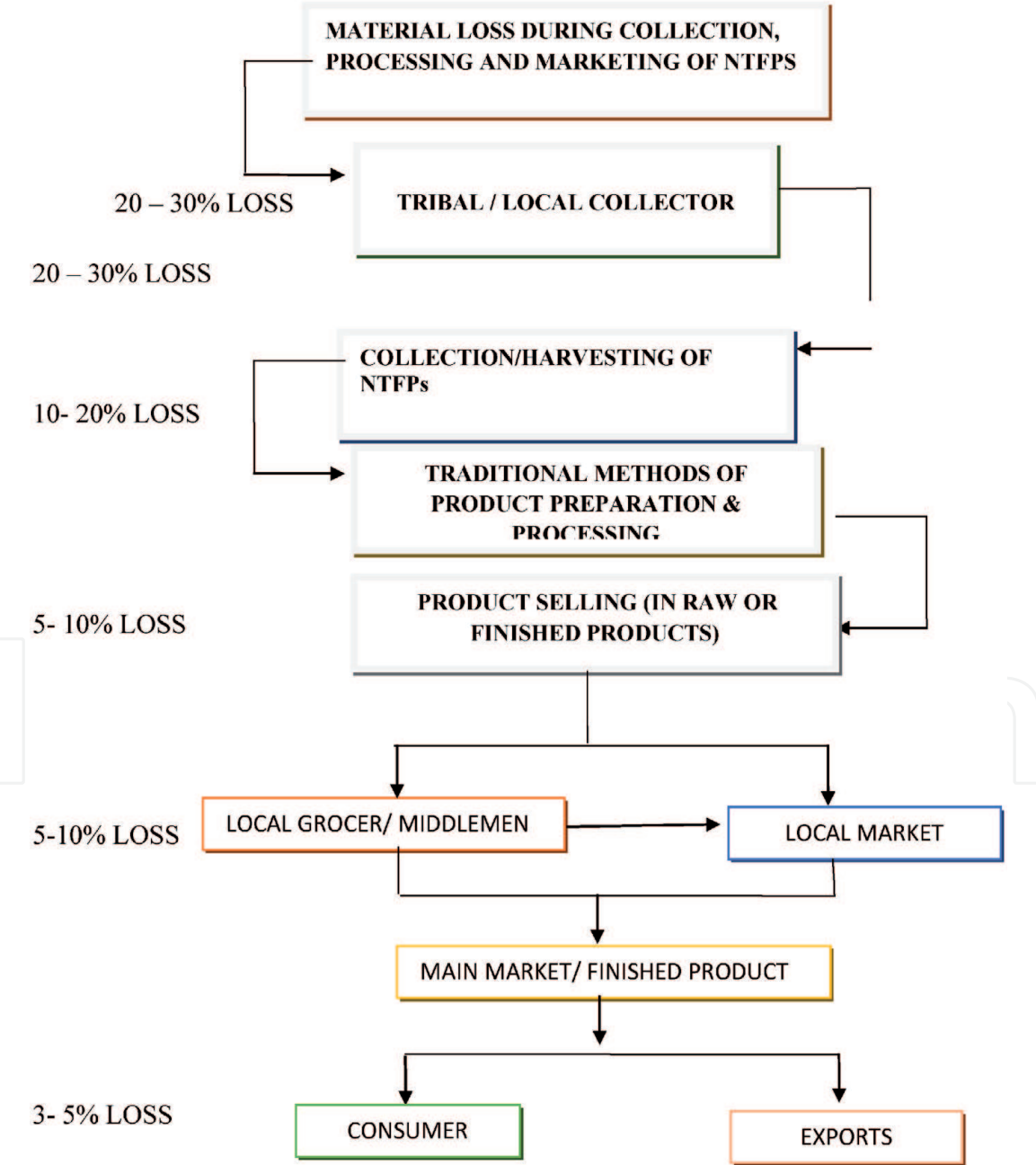
**Figure 3.**  
*A schematic representation of economic activities in a tribal family.*



**Figure 4.**  
*Flow chart of process of NTFP allocation.*

lowest socioeconomic strata. Such experiences are recorded in a number of studies [13] studied in Northern Mexico, [14] in Khunjerab National Park (KNP) where he highlights the “exclusionary principle is neither new nor the environmental agencies and NGOs intervention, part of the blame for the failure of the KNP must fall on IUCN, the WWF and other organizations whose global mission for protecting wildlife could not contain or tackle the needs of local people who mostly involuntarily become involved in wildlife conservation. [38] while analyzing the Ngorongoro Conservation Area (NCA) in northern Tanzania in which International

Wildlife Conservation lobby was expelling huge number of pastoralists and their livestock because of environmental degradation and their impact on conservation values. Similarly [5] described the shortcomings in attending the combination of pastoral development and wildlife conservation using the case of the Amboseli Park in southern Kenya. In the present studies conducted in India exhibited over harvesting, over stocking and exploitation resulting in desertification and diminishing economic returns over a period of 5–10 years for a particular Forest Produce. Similar observations were also made, where overstocking, over grazing and desertifications have become self –reinforcing concepts, and the general rangelands have been expropriated for exclusive wild life conservation use [38]. The universal applicability of the concepts of overgrazing and desertification has been seriously questioned. [39], shows convincingly how an opportunistic strategy in tropical Savannah areas is economically more efficient in terms of returns to farmers, than a governmental strategy based on the concept of carrying capacity. He concludes that evaluations



**Figure 5.**  
*Flow chart of loss of material loss.*

of conflicting perspectives thus becomes both political and technical and demands that more serious consideration is given to farmer's knowledge.

Drastic commercialization and greed for quick buck coupled with amassing wealth in the shortest possible time, the livelihood resources mostly of NTFPs are harvested rapidly rendering depletion of basic material for rejuvenation and succession of plant biomass in different strata of forests. A study conducted in India indicates substantial loss of natural resources at various stages of supply chain which is depicted in the **Figure 5**. It may be observed that the highest loss of harvested product loss is in the first phase of product collection itself (20–30%). The impact of such a huge loss has a cascading effect on the rejuvenation of forests and their succession in the long run. However, frequency of harvesting activities should not deplete the resource base, should have minimal or no immediate environmental impact. Livelihood of local population should not be compromised by NTFP harvesting at commercial magnitude [40]. Unfortunately, resource extracted in excess resulting depletion and unsustainable scavenging practices is predominantly a common system in the sector. Although the thrust of the article identified other than environmental implications of NTFP harvesting and processing, over 40% broach negative ecological effects most commonly, over exploitation of the resource that become scarce. Uncontrolled and excessive harvesting due to high demand of the resource and unsustainable and primitive techniques of harvesting which leads to destructive harvesting [7, 41] or harvesting before sexual reproduction is reached [42], can lead to an overall of the resource crunch and a lower rate of forest regeneration and productivity of the NTFP species. The aggravated harvesting pressure leads to likely considerable post-harvest losses caused by a lack of or inadequate storage facilities which may lead to insect infestation or microbiological and fungal contamination. Indirect negative environmental implications can occur as well, such as the need for other natural resources, in particular firewood, for processing activities [43] or pollution and hunting during NTFP harvesting process [36] leading to further environmental degradation.

### **3. Threshold indicator**

Critical analysis of degraded forests is essential to know if forests are being degraded and, if so, the reasons and the measures that could be taken to stop and restore the process forests regeneration has be put in place. Comprehensive knowledge on forest status and the degree of damage inflicted on forest resulting in degradation essentially is required to prioritize manual work force and financial resources to arrest further deterioration of inflicted damage and to re-establish and rehabilitate degraded forests.

The level and status of forest degradation can be categorized as either degraded or non-degraded and a process where the forests are at a threshold along a stretch of continuum of such degradation. Thresholds or reference points are needed to estimate the status of a forest, or the magnitude of disturbance caused along a sequence, and they may vary between countries and even within countries. Forests continuum changes due to natural procedure and human activity. However, when a boundaries of forests change modifying beyond a certain limit or amount, the forests may be classified to be degraded. Tipping point is another word used similar to the concept of threshold to describe the point at which the activity of degradation mortification becomes unrepairable (without intervention), leading to the changes to a permanent state.

### 3.1 Components of SFM

We can deduce a few thematic components of SFM, such as the quantum of forest resources dimension; biological diversity within the forest ecosystem; forest robustness and exuberance; resource productivity and functional attributes of forest; Safeguarding responsibility of forest resources; socio-economic concomitant of forests; and legal, policy and organizational scaffolding (United Nations, 2007). A thematic variables component, or variations of them, stands the grounds for all the forest-related regional and international Criteria & Indicator (C&I) processes (FAO, 2003). Forests monitoring and reporting and appraising the status of forest management practices are fundamentally governed by the C&I designed and developed solely for this purpose. The C & I processes can be employed to audit purpose of evaluation SFM at different levels like national, sub-national and forest management unit (FMU) levels. They also provide suitable structural boundaries for critical analysis of status of forest degradation (FAO, 2009).

In a larger context, the SFM components circumscribe advantages placed on forest resources; therefore, forest degradation can be evaluated in terms of the amplitude of a forest to bestow those economic advantages. The major impediment in quantifying forest degradation is the inexplicit, conglomerate and often prejudiced interpretations of the concept (FAO, 2009). Any suggested procedure or technique must prescribe for and recognize various perceptions of it. Four key selection criteria have been used from the SFM components based on the indicators identified for each and that they are quantifiable. The four criteria are: forest biological diversity; biomass, growing stock and carbon; assessing forest degradation 6 productive functions; protective functions. However SFM criterion of 'legal, policy, and institutional framework', indicators of forest degradation have proven less uncomplicated to identify. The applicability of the criterion 'proportion of forest resources' was ambiguous; therefore, neither of these is talked about in this analytical review. To some portion, the criterion 'socio-economic functionality of forests' is covered by the criterion 'productive functional attributes of forest resources' as loss of forest productivity would have profuse bearing for many of the socio-economic linked benefits of forests. Hence, this indicator has been included, for forest produces. On the other hand, it was considered that the quantified measurement of all forest services is a very complex process it would be inappropriate and comprehensive detailing is beyond the scope of this paper. Since many forest benefits are of directly derived, such direct benefits could be measured in quantified terms with the changes in the supply of forest goods, while many services can only be measured indirectly. Plant Biomass, Net Primary Productivity resulting growing stock and carbon can be grouped separately where its impact or changes can measured in quantified terms that can feature as an indicator. Enumerating the biomass in quantified terms and its importance being recognized can be obtained through the measurement of growing stock or directly through biomass measures, and measures of carbon storage can be obtained using such as Vegetation carbon storage estimates, soil carbon storage estimation and litter carbon storage estimate are some standard methods adopted. Soil health or status as an indicator presents the condition of soil erosion as factor that impacts and regulates the sustained supply of forest goods and services that requires stable and fertile soils. The other determining factors such as soil salinity, soil structural variations or modifications, loss of organic matter, aspects of soil degradation, such as salinization, soil structure decline, organic matter loss, soil nutrient status and contamination are some of the other edaphic factors that determine sustainability of forests which are not considered within the scope of this paper.



## 4. Conclusion

The importance of NTFPs in rural sustainable livelihoods are directly proportional to the conservation interventions of forest wealth which in turn have an impact on poverty reduction. The communities engaged in doing NTFPs value addition as an enterprise will be benefited with uninterrupted supply of raw materials thus strengthening the NTFP raw material base, simultaneously the processing units of these NTFPs quality will improve which have a cascading effect on rural livelihoods. But they people benefiting from the NTFP dependent enterprises should know and mitigate the negative impact on environment. Evolve and reinforce efforts of various projects and programs to achieve food security, escalate cash flow through income and conserve forests through NTFP related interventions. To achieve the UN Development goals during the course of present investigation, a comprehensive approach to have to be adopted which are enumerated as follows;

- a. Using the present technology of satellite imaging mapping the of deforested areas that are to be restored, forest areas that put under the danger of destruction and lands which have degraded and are catchment areas which needs to be sustained for mitigating climate change should be made a priority for each country by the UNEP and mandatory for every country to follow.
- b. National level Forest inventory of NTFPs are to be made and categorizing the consumption pattern of NTFPs such as (i) high commercial value products and high demand, (ii) moderate value season based demand (iii) high value but low demand products.
- c. High commercial value and high in demand NTFPs should be shifted to cultivable category in degraded zones so that the supply of products would not be affected and employment is generated to the native population away from conservation areas. For example in India Temperate and Tropical Tasar silk-worms feeding on *Terminalia arjuna*, *Terminalia tomentosa*, *Quercus accutissima*, *Quercus serrata* which are basically product of non-timber forest based activity has been now made a commercially viable income generating activity forest dwelling of the based on volume of production and demand for silk yarn production.
- d. The conservation along with native biodiversity should invariably brought under the irrigated forest land without access for a longer durations not less than five years except for native population who have land tending rights to maintain those irrigated forest land. Such delimitation would safeguard the sustenance rights of the local population by cultivating the high value – high demand product on commercial scale while protecting the forest lands for conservation would enable succession of forests in their natural form. The rejuvenation of such forest should be expanded slowly to contiguous areas so that the impact of deforestation and climate change can be mitigated faster without sacrificing the living rights of local population without compromising the environmental safety and balance of climate changes.

Such comprehensive and broader efforts globally could escalate and impact on achieving sustainability goals and reinforce the national and international conglomeration to respond proactively to contain poverty and secure livelihoods of local communities of their respective countries as a responsible welfare state.

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