

Article

# Institutional Interplay in Natural Resources Governance: Toward a Sub-Sectoral Approach for Medicinal Plants Management in Bangladesh

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**Abstract:** Recognizing the significance of medicinal plants for rural livelihoods and primary healthcare, this paper attempted to analyze institutional interplays in medicinal plants management in Bangladesh. It assessed the governing process of natural resources by identifying cross-scale linkages of the institutions involved with managing medicinal plants. The study intended to delineate the interactional patterns and dynamics between existing formal and informal organizations toward exploring prospects of new medicinal plants governance institutions. Employing case study and participatory approaches to empirical field investigation, two intervention cases of the Livelihood and Agro-Forestry (LEAF) and Sustainable Environmental Management Program (SEMP) were assessed in two different social-ecological settings of the country. Involving 45 respondents in each site, Focus Group Discussions were carried out, and a total of 26 Key Informants were interviewed. The findings have revealed that undefined roles and responsibilities, inadequate coordination, and weak linkages among the cross-scale institutions resulted in ineffective management and relatively poor performance. Institutions with direct or indirect involvement in the process of managing medicinal plants interacted haphazardly, without much focus on the subsector and its local producers. Addressing the weaknesses, this study calls for formulating a national sub-sectoral approach focusing on strengthening and sustaining local producers and value addition to

producer levels. Finally, this research offers a framework for developing a multi-stakeholder forum to govern medicinal plant resources coherently and effectively in Bangladesh.

**Keywords:** institutional interplay; medicinal plants; ethno-medicine; resource management; governance

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## 1. Introduction

Institutional performance, which has received wider attention in the new social science of resource management [1,2], is vital for formulating effective natural resource management strategies. Institutions, with their organizational setup, rules and regulations, norms, and customs, form the lifeline for management. The system of management is generally governed by a framework of evolving processes that is commonly known as “governance” [3,4]. Governance relies on institutions and exists within their functional interplays. Rhodes [5] and Kjaer [6] characterize governance as self-organizing, inter-organizational, interdependent networks, resources-exchange, rules of the game, and significant autonomy from the state. In natural resources management, these institutions range from local community level to state level entities. Their major constituents include private sector, government and non-governmental organizations, community-based organizations, civil society institutions, and multilateral development agencies.

Recognizing their significance for rural livelihoods, primary healthcare, and local community development, this paper intends to analyze some of the key medicinal plants management issues in Bangladesh. It examines the governing process of these resources by identifying cross-scale linkages of the institutions involved with managing medicinal plants. It also delineates the interactional patterns and dynamics between existing formal and informal organizations. The absence of specific authority to promote medicinal plant resources in the country, alongside persistently diverse institutional governance arrangement, guided this study to critically analyze medicinal plants governance from a sub-sectoral perspective.

## 2. Institutions in Natural Resources Management

In the existing literature, it has been cited that the loss of traditional methods in resource management and the lack of appropriate institutional arrangement have had noticeably adverse effects on people’s control over and the dependability on resources [7]. Ameeruddy *et al.* [8], in this context, noted that traditional formal institutions are no better adapted to management for resource sustainability; the weaknesses in addressing evolving global and local views, needs, and interests contribute to their ineptness.

Traditionally, natural resources including pastures, wastelands, forests, fishing grounds, ground water, and water points (wells, rivers, lakes) were sustainably managed by local people under common property systems, particularly during precolonial times. Specific units of social organizations e.g., clan leadership, local chiefs, or spiritual leaders, used to play a significant role in governing these resources. Nonetheless, presuming the incapability of the locals, such management systems were later usurped by

governments [9,10]. Consequently, centralized bureaucracies assumed absolute control over all types of natural resources, which exacerbated environmental degradation in many countries and regions.

The limited success of centralized approaches in achieving effective sustainable resource management at the local level provoked the search for alternative approaches, and led to the desire for adoption of community-based approaches [11]. The overall failure of the centralized approaches is attributed to the lack of relevant information on local resource conditions, inadequate inputs and supports, and lack of ownership and therefore unwillingness of local communities to participate in the management of natural resources [10]. Consequently, the call for participatory resource management approaches gained momentum in recent decades for two fundamental reasons [12]: (i) there has been a significant increase in the number of interested stakeholders and civil society organizations throughout the world; and (ii) participatory management practice has received wider acceptance and thus emerged as one of the dominant approaches. Thus, the scope for participation by multiple stakeholders added new layers into the complexities in the resource management decision-making process.

Subsequently, collaboration and partnership building among stakeholders emerged as a more pragmatic approach to managing natural resources and ensuring their sustainability. In this regard, Berkes [12] propounds multi-stakeholder bodies that link multiple user groups and interests at local and regional levels with the government, and provide a forum for conflict resolution and negotiation. This form of management involves local communities—especially resource-user groups. Amidst such backdrops, the emergence of co-management (or joint management) of resources can broadly be viewed as policy and program initiatives or institutional arrangements that allow governments, donors, private-sector interests, and NGOs to collaborate with communities in managing resources.

### *2.1. Multi-Stakeholder Institutional Approach and Interplays*

Among several schools of thoughts, two perspectives that deal with institutional linkages and involve multi-stakeholders deserve particular attention. First, conservationists, e.g., T. Enters *et al.* or S. Shackleton *et al.*; [13,14], often argue that to promote sustainable management of natural resources there should be suitable institutional setups in favor of the major devolution of management authority to local stakeholders. The approach entails the support and facilitation of government agencies, NGOs, academia, and the private sector through information sharing, technical inputs, and enunciation of local perspectives [15]. This view emphasizes the need to work across various scales—local, regional, national, and international, with different stakeholders.

Second, Fikret Berkes [12] suggests that management institutions are to be designed and supported at more than one level, with attention to interplays across scales. These interplays take place from the local level upwards—which he terms “cross-scale interactions.” The essence of this assertion is to link institutions both horizontally (across space) and vertically (across levels of organization). The art of resource management is, therefore, essentially reliant on institutional interplays at various spatial levels, and embodies a multi-stakeholder approach. However, the applicability of the approach is not well-proven yet [16] because ecological and environmental factors, regulatory mechanisms, technology choice, market information, and the availability of professional extension and support services could be overriding issues weakening the approach.

## 2.2. Sub-Sectoral Approach and Collaborative Management

A subsector implies an array of organizations, resources, laws, and institutions involved in producing, processing, and distributing a particular resource e.g., medicinal plants [17]. A sub-sectoral management approach requires actors of the value chain of a particular product or resource to work closely, preferably in a vertically integrated fashion [18]. For example, the Medicinal and Aromatic Plants Program in South Asia (MAPPA; formerly known as IDRC Medicinal Plants Network—IMPAN), advocates a sub-sectoral approach to develop an economically, socially, and environmentally beneficial and sustainable medicinal plants resource base in the South Asia region.

The approach proposed the development of close and enduring relationships among all the concerned stakeholders, the majority of which are formed between industry and forest-dependent rural communities. In this regard, Holly and Cherla [19] cited the work of an “industry–rural community partnership,” whereby herbal drug companies and local communities collaborate for mutual benefit on a sustainable and equitable basis. The underlying significance of such a partnership is to maintain a sustainable supply source in the face of increasingly unreliable markets for medicinal plant raw materials, which is important for a process that has been largely secretive, inefficient, and frequently exploitative [19].

In such a context, the issue of social justice was introduced by the M.S. Swaminathan Research Foundation (MSSRF) in Chennai, India, which upholds the notion that empowering poor farming communities—especially women, tribal people, and small farmers—is necessary to ensure an equitable share of the benefits of the common pool resources (e.g., forests, grazing land, *etc.*) that they are entitled to access and utilize. The concept of “bio-partnership,” a “social contract” for “access and benefit sharing” (ABS) in natural resource governance that is symbiotic in nature, linking industry and local communities in an interdependent and collaborative manner, has merit here [20,21].

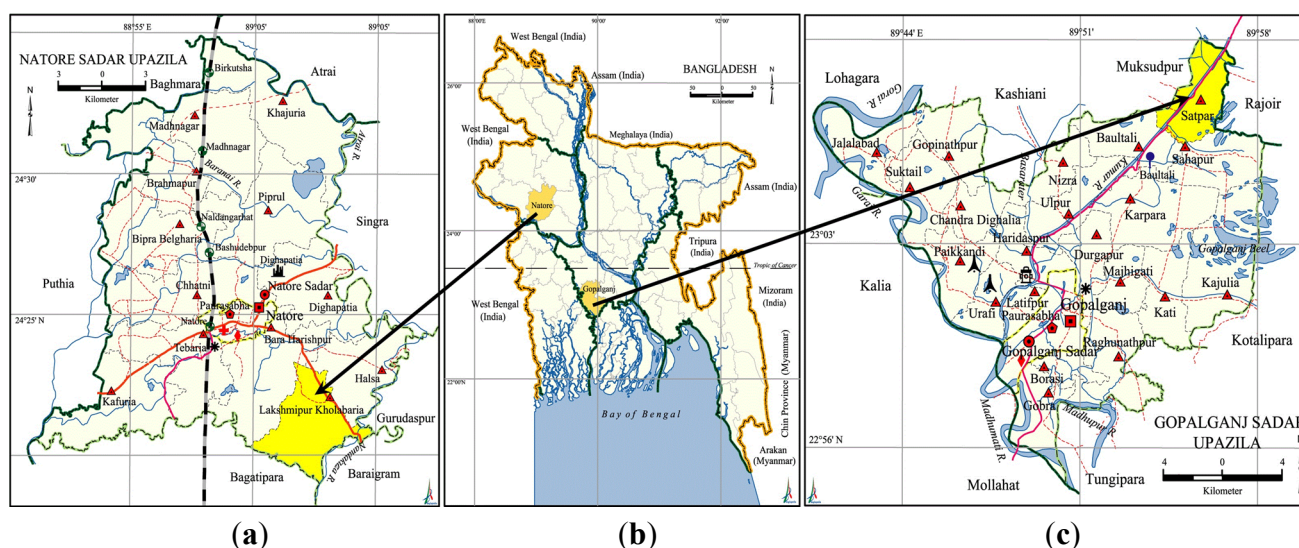
## 3. Methodology

In terms of strategy of inquiry, this research adopted a qualitative ‘case study’ approach [22], using various “participatory” [23] methods. Two intervention cases were examined in northwest Bangladesh: (i) Livelihood Empowerment and Agro-Forestry (LEAF; see Case 1); and (ii) Sustainable Environmental Management Program (SEMP; see Case 2). Medicinal plants management and promotion was one of the key components of those interventions. The cases were selected based on homogeneity in their programmatic focus.

### 3.1. Case 1: Livelihood Empowerment and Agro-Forestry (LEAF)

The study site for Case 1 was located in Natore District, Bangladesh (Figure 1). Intercooperation, a Swiss development agency, implemented Livelihood Empowerment and Agro-Forestry’s (LEAF) medicinal plants-based livelihood improvement and poverty reduction program at the Laxmipur-Kholabaria and Halsha unions of Natore Sadar *upazila* (Figure 1a). This program received implementation assistance from LUSTRE, a local NGO. The LEAF program started its operation in 2004, with a key message, “encouraging and equipping small farmers to take responsibility for their own development” [24]. The project worked through four main action lines, which were: (i) improvement of knowledge and skills; (ii) strengthening of farmers’ organizations; (iii) promotion of enabling

environment; and (iv) promotion of producers' rights and social issues. The project aimed to enable farmers to identify their development priorities and implement joint plans; it subsequently linked them with service providers and local government agencies, and equipped them to take advantage of the market opportunities—thereby developing a critical mass of joint actions by farmers through interactions between geographically close groups.



**Figure 1.** Field sites for the case studies (LEAF and SEMP) in Bangladesh. (a) Case study site 1: Natore Sadar upazila; (b) Natore and Gopalganj districts on the map of Bangladesh; (c) Case study site 2: Gopalganj Sadar upazila.

### 3.2. Case 2: Sustainable Environmental Management Program (SEMP)

Case study 2 was conducted in Gopalganj district, Bangladesh (Figure 1). One of the primary objectives of this component was to enhance the capacity of the *Kabiraj* in order to sustain local traditions of plant-based primary healthcare. The International Union for Conservation of Nature (IUCN) and the Bangladesh Centre for Advanced Studies (BCAS) implemented the Sustainable Environmental Management Program (SEMP) project component in the Madhumati floodplain area in Gopalganj Sadar upazila (Figure 1) of the district. The area is characterized by a good number of medicinal plant species, which have traditionally played a significant role in primary healthcare of the local people. A total of 135 *Kabiraj* (Ayrvedic practitioners) and traditional plant-dependent healers live in and around the locality. IUCN, as one of the implementing partners of SEMP, was responsible for promoting community-based floodplain resource management. The BCAS provided the required field implementation assistance.

In order to attain a comprehensive analysis of the medicinal plants subsector, we used participatory rural appraisal tools (PRA) for understanding the roles and responsibilities of organizations, groups, communities, and individuals. Focus group discussions (FGDs) were carried out with the community groups at SEMP and LEAF project study sites—whereby 45 respondents directly participated in each site. Key informant interviews (KIIs) were held with 4 regional project managers; 4 representatives of herbal medicine processors' associations; and 18 senior management personnel representing herbal medicine producers. Among the 18 herbal processing company representatives interviewed, 9 were

selected from the *Ayurved system* and the other 9 from the *Unani system*, comprising micro, small, and medium size enterprises.

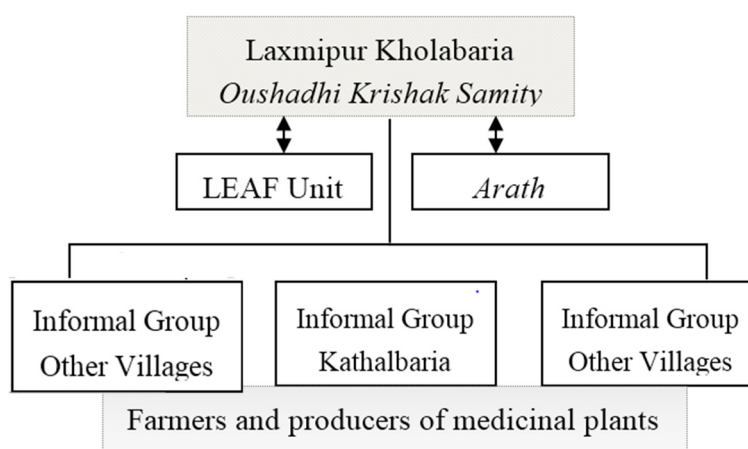
Venn diagrams enabled the researchers to identify membership, spheres of influence, overlaps, locations, and relative importance of different institutions. Institutional linkage and interplay analysis was carried out by adopting Tools for Institutional, Political and Social Analysis (TIPS) [25]. This tool guided us to explore “broader network of flows of decision making, resources, and information in policy implementation” [25]. We obtained detailed flow diagrams of the network and interplays of the institutions across scales (local to national) by customizing TIPS. We also identified bottlenecks and constraints inherent to the institutional arrangement in governing medicinal plants resources. TIPS was also instrumental in capturing opportunities for efficient governance and effective institutional interplays of the medicinal plants subsector. Finally, a multi-stakeholder workshop was organized to conceptualize a sub-sectoral governance framework for medicinal plants resources.

#### 4. Results: Institution and Interplays

The SEMP and LEAF projects, which were implemented at the community level with stakeholders at *union*, *upazila*, district, and national levels, portray detailed institutional arrangement and interplays of these local resource management and conservation schemes. The present study revealed the following cross-scale institutional arrangements, linkages, and interplays:

##### 4.1. Local Scale

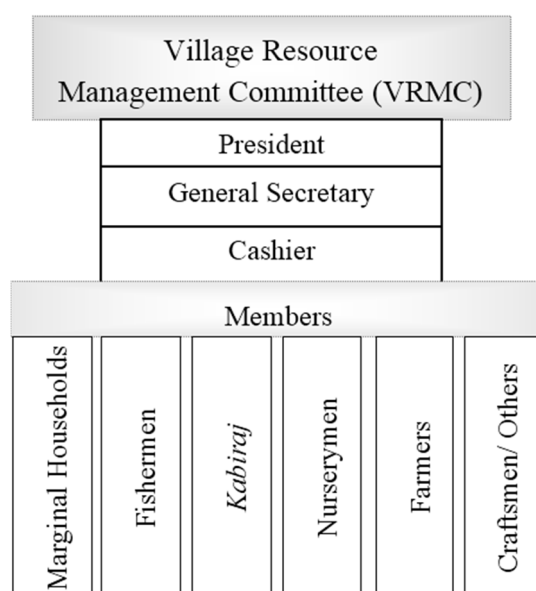
Local institutions did not exist in managing medicinal plant resources in Bangladesh prior to 2000. In Case study site 1, Intercooperation introduced the Village Farm Forestry Program (VFFP) in 2001, which organized farmers to develop a Tree Farmers Group (TFG) in their respective project areas for managing the agro-forestry activities of the project beneficiaries. Medicinal plants, being one of the agro-forestry components, were managed locally by those TFGs. The medicinal plant farmers later in 2003 formed a local organization, *Laxmipur Kholabaria Oushadi Krishak Samity* or “Laxmipur Kholabaria Medicinal Plants Farmers Association” (Figure 2).



**Figure 2.** Interplay of the medicinal plants farmers’ association.

Laxmipur Kholabaria Medicinal Plants Farmers Association governed the sales and marketing of harvested medicinal plants and plant-based goods produced by the members. It advised, supervised, oversaw, and supported production and primary processing. The functional attributes of the association were: (i) establishment of a centralized supply system by setting up an *aarath* (central sales depot); (ii) setting price based on seasonality and market demand; (iii) managing demand and supply through purchase requisition and sales slip; (iv) resolving conflicts; and (v) networking with relevant line institutions and organizations.

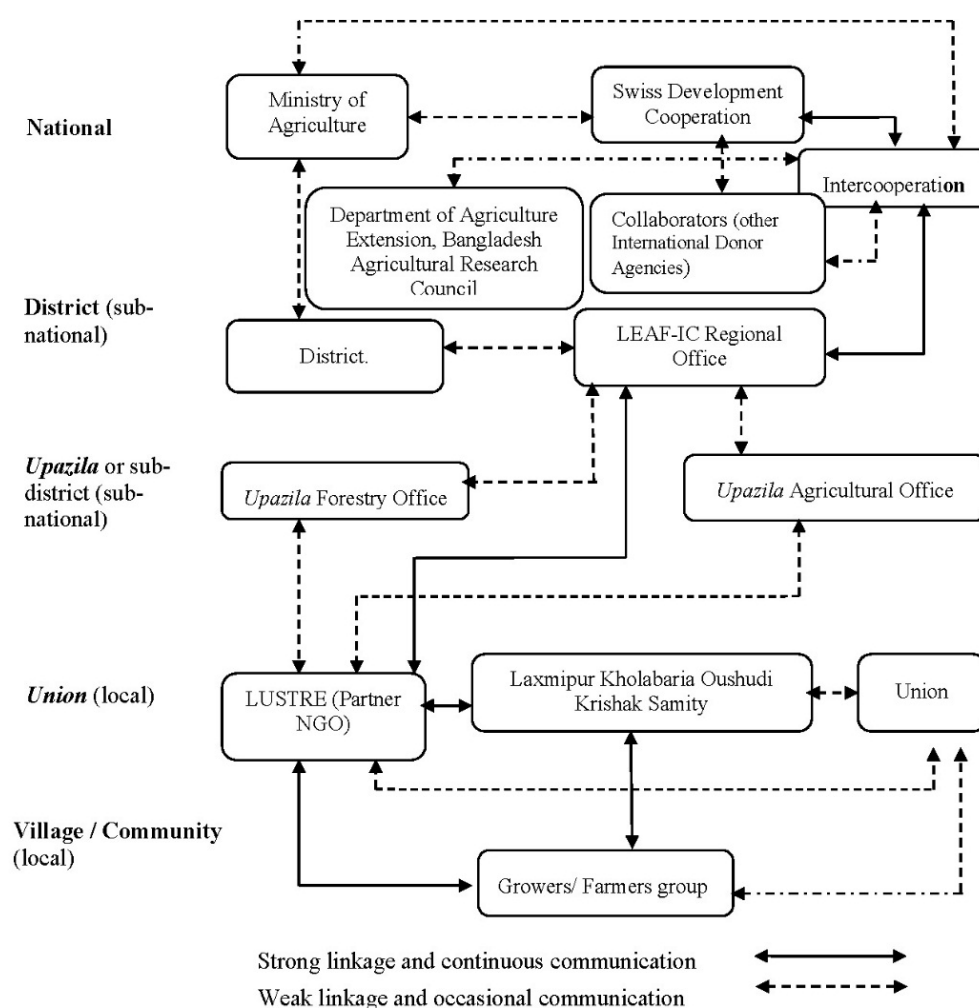
In Case study site 2, SEMP established a Village Resource Management Committee (VRMC), which emerged as the local institution for medicinal plant management (Figure 3). The VRMC members comprised local resource-users e.g. *kabiraj*, nurserymen, farmers, fishermen, craftsmen, and marginal household members. The VRMC decided on the sustainable use and promotion of local resources. *Kabiraj*, nurserymen, and farmers assumed primary responsibility concerning medicinal plants.



**Figure 3.** Interplay of the Village Resource Management Committee.

#### 4.2. Local Scale-Up

Natural resources and environmental management are neither confined to a large scale nor a small scale, but rather they are cross-scale phenomena, both spatially and temporally non-linear in nature, and exhibit an evolutionary character [26]. This assertion suggests that development projects require effective coordination between organizations located at different vertical and horizontal scales. Such coordination allows outcome-oriented interplays by accommodating the diverse interests of stakeholders. Ideally, cooperation across scales can result in a situation where the strengths of one institution can be used to offset the weaknesses of another [12,27]. In Case study site 1, there have been strong linkages between medicinal plants growers and project implementers at the grassroots level, as shown in Figure 4 below:



**Figure 4.** Local scale-up linkages in Livelihood Empowerment and Agroforestry–Intercooperation (LEAF–IC) intervention project.

The trust of community people on LUSTRE (Intercooperation’s implementing partner) served as a catalyst for project inception. A strong network of communication existed between Intercooperation–LEAF regional office, the project field office, and the community organization (*Laxmipur-Kholabaria Oushadi Krishak Samity*). The activities of Intercooperation in Bangladesh, with technical guidance and assistance from Swiss Development Cooperation (SDC) and its collaborators, were regionalized. Communication and implementation of activities were frequent and ample from the top to the grassroots level.

LUSTRE’s assistance to the farmers’ organization, *i.e.*, the *samity*, significantly enhanced its planning, organizing, communicating, and controlling capacity. The combined efforts of both the organizations had been vital for enhancing *samity*’s bargaining capacity and marketing strategy. For example, decisions regarding the supply schedule and price for several commercially important as well as most traded species such as *Aloe vera*, *Asparagus racemosus*, and *Bombax ceiba* that were grown by the community were successfully made by the *samity*.

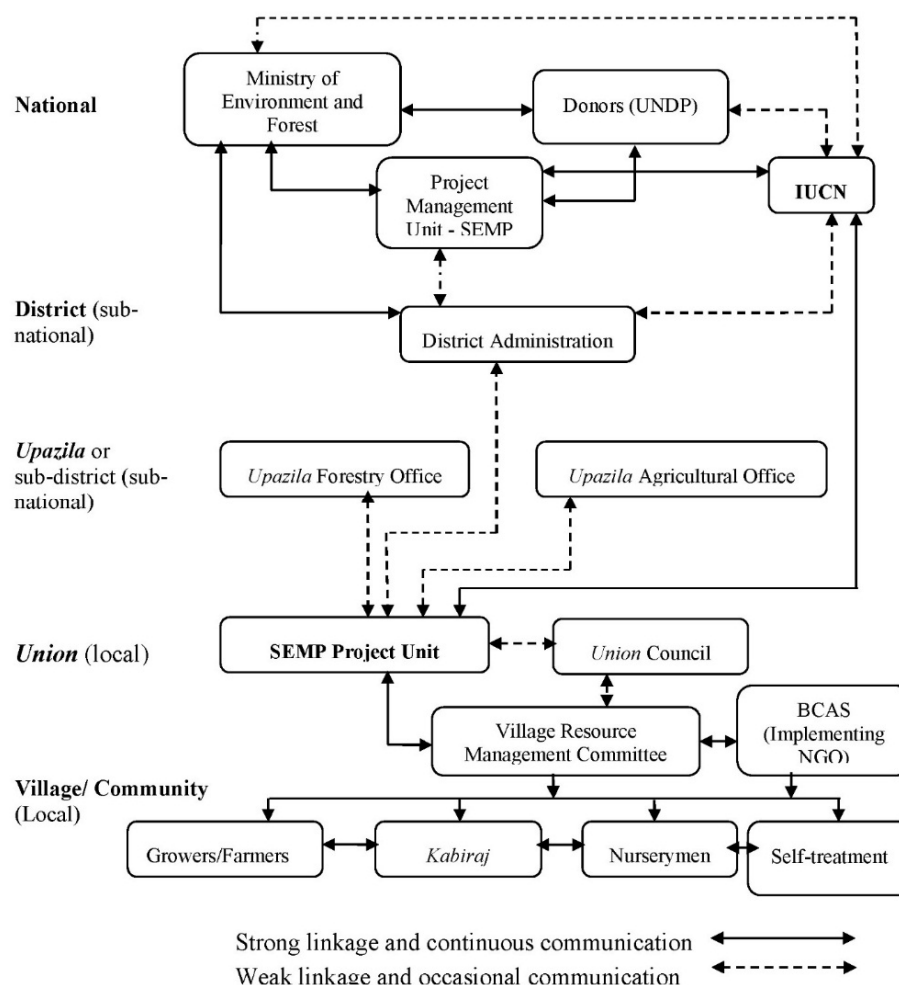
Intercooperation–LEAF also extended technical support to the *samity* and organized a “medicinal plant fair” to link them with potential buyers. The partnered program provided a soft loan to the new and interested cultivators, and seed money as a startup capital grant for saplings and seedlings. The *samity*



also received technical guidance from the Department of Agricultural Extension (DAE) and the Bangladesh Agricultural Research Council (BARC). Further supports *i.e.*, networking with policy-makers and stakeholders and market access assistance were also offered by those two organizations.

In Case study site 2, the implementing organization, Bangladesh Centre for Advanced Studies (BCAS), had pre-established linkage with project communities. With awareness raising through videos and folk dramas, it mobilized communities and formed a Village Resource Management Committee (VRMC) to promote and manage natural resources, including medicinal plants. Collaboration between BCAS and VRMC, with active guidance from IUCN, was instrumental in achieving medicinal plants conservation goals. The central project management unit (PMU), comprised of the Ministry of Environment and Forest (MoEF), the United Nations Development Program (UNDP), and the IUCN, monitored the activities of this intervention.

The participatory role of the local government unit (*i.e.*, union) was pivotal in project functioning. However, despite community expectation of a stronger link between local stakeholders and *upazila* forestry and agricultural offices, a weak link prevailed. The MoEF designated the district administration to oversee the project implementation process, which eventually did not assist any effective interplay among the stakeholders. The linkages identified between the stakeholder institutions of the medicinal plant-based resources at different levels and scales are shown in Figure 5 below:



**Figure 5.** Local scale-up linkages in the Sustainable Environment Management Program–International Union for Conservation of Nature (SEMP–IUCN) intervention project.

### 4.3. Sub-National and National Scales

Donor agencies and NGOs promoting the medicinal plant sector focused on livelihood improvement through consolidation, expansion, and intensification of the medicinal plant program in various scales—especially the sub-national and national. In Bangladesh UNDP, the German Technical Cooperation (then the GTZ), *Grameen Krishi Foundation* (GKF), the Bangladesh Rural Administrative Committee (BRAC), the Swiss Development Cooperation (SDC), the World Bank, the former Canadian International Development Agency (CIDA), the Norwegian Agency for Development Cooperation (NORAD), the World Health Organization (WHO), and the Food and Agricultural Organization (FAO) played a significant role in promoting medicinal plant resources.

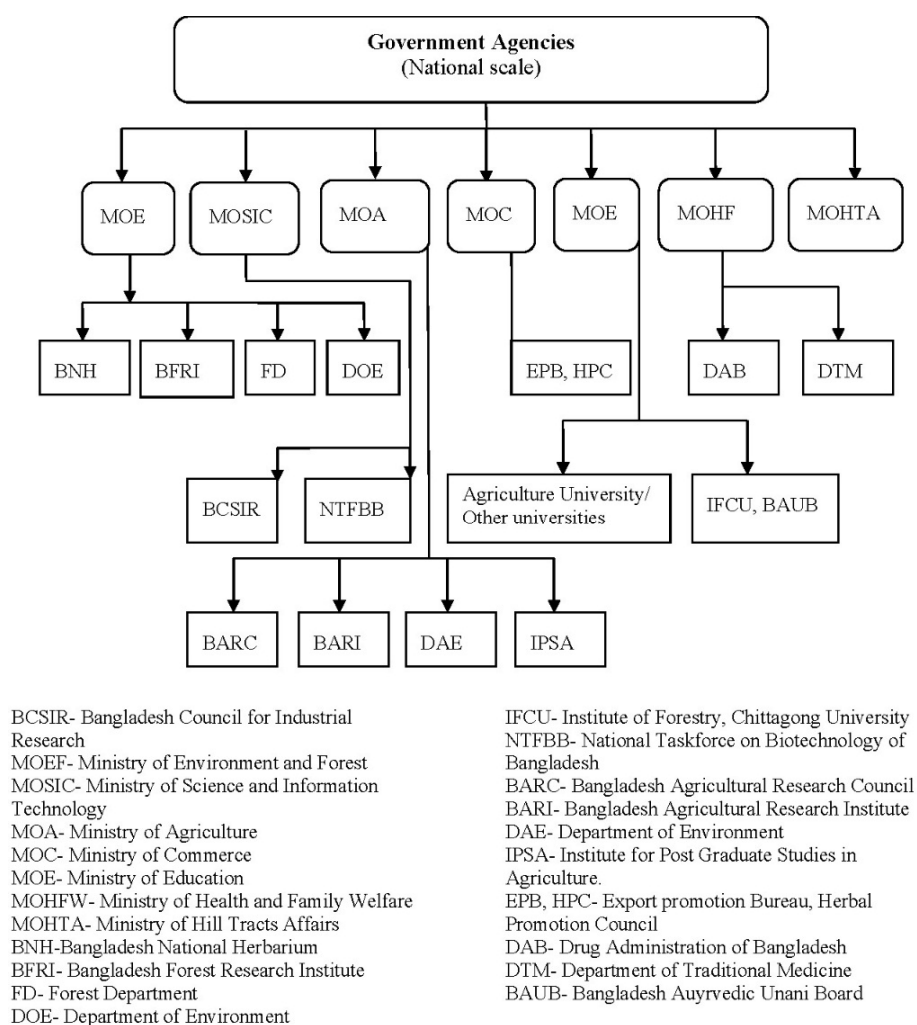
With the technical and financial assistance of these organizations, implementing agencies, *i.e.*, the International Union for Conservation of Nature (IUCN), the SouthAsia Enterprise Development Facility (SEDF), and Intercooperation (IC), undertook programs on the improvement and sustainable management of medicinal plant resources. In addition, the herbal medicine sector had four apex bodies: (i) the Bangladesh Homeopathic Unani Ayurvedic Federation, which mainly looked after the interests of the overall herbal industrial sector; (ii) the Bangladesh *Ayurved* Parishad; (iii) *Bangladesh Unani Oushudh Shilpa Samity*; and a professional organization iv) Botanical Society of Bangladesh (BSB). These sectoral and professional bodies performed key roles in policy, strategy formulation, and promotion of medicinal plants and plants-based resources.

There were other governance institutions contributing to the intricacies of interplays in the herbal medicine sector. They were: (i) the Drug Administration of Bangladesh—regulating registration and certification, and supervising herbal medicine processing activities; (ii) the National Herbarium—conserving endangered species, and archiving and housing species records; (iii) the Bangladesh Council of Scientific and Industrial Research (BCSIR)—developing appropriate technology; (iv) the Bangladesh Forest Research Institute (BFRI)—researching ethno-medicinal plants; and (v) the National Ayurved and Unani Board—administering ethno-medicine education and support services. Other nested organizations dealing with plant genetic resources including ethno-medicinal plants were: (i) the Bangladesh Agricultural Research Council (BARC); and (ii) the Bangladesh Agricultural Research Institute (BARI).

Evidently, there had been no formal institution that exclusively governed the conservation and promotion of medicinal plants resources. In general, medicinal plants had been regarded as plant genetic resources in the government agenda [28]; institutes that oversaw plant genetic resources are illustrated in Figure 6 below.

The medicinal plants-based industry, as a subsector of the healthcare market, is growing. Three herbal medicinal system *i.e.*, *unani*, *ayurved*, and *homeopath* rely upon a local supply of medicinal plants. Buyers and sellers involved in the medicinal plants sub-sectoral value chain are: input suppliers, primary producers and processors, brokers and traders, wholesalers, manufacturers, distributors, herbal healers (*Kabiraj*, *Hekim*, *Baiddaya*), retailers (mainly herbal dispensaries), and consumers. The presence of brokers at local and sub-national levels distorts the market and often causes inflated prices. This complex composition of buyers and sellers influences regulatory practices in the form of growers' diminished control over market price determination. Conversely, institutional linkage among the primary producers with wholesalers and manufacturers of herbal materials offsets such distortions and yields better price

benefits for the community growers. *Ayurved* and *unani* processors and industry experts view that institutional arrangement, ensuring a closer linkage between producers and processors (keeping away the brokers and intermediaries), as critical in bringing efficiency to the medicinal plants subsector.



**Figure 6.** Government institutions for plant genetic resources (including medicinal plants) in Bangladesh.

## 5. Discussion: Efficacy of Existing Interplays and Need for a Sub-Sectoral Forum

Institutions governing medicinal plants resources are placed across scales mostly without definitive roles. In this study, Case study 1 illustrates the formation of local institutions by local communities. Technical assistance from the partner NGO (LUSTRE) helped them develop a constitution, an operational policy, marketing strategies, and networking guidelines. Similarly, communities in Case study 2 also formed village-based (e.g., VRMC) institutions applying the guidelines of the partner NGO (BCAS). Notwithstanding, institutional self-sufficiency and sustainability require prolonged support. As Cramb and Culasero [29], and Bolger [30] perceive, development is a small, incremental, and time-consuming process. Recognizing this notion, donor organizations need to consider continuation of support and endeavors for a longer period of time. The self-sufficiency and sustainability of project-supported institutions are very challenging to attain within a span of three to five years.

The two local-level organizations under study functioned within their spatial contexts, and their upward institutional linkage remained weak. Although the local institution in Case study 1 (*i.e.*, the farmers' association) demonstrated considerable success in sales regulation, it lacked major drives in capacity building, process and quality improvement, and accessibility into an upstream value chain. The VRMC (Case study 2) gained substantial capability in developing its own annual program of operations during the project period. It is revealed that the organization became dysfunctional on expiry of the larger program's (*i.e.*, SEMP) tenure. However, partnership between an NGO and community organization in both cases (*i.e.*, LUSTRE and farmer association; and VRMC and BCAS) resulted in benefits flowing from the individual to the group as well as to broader societal levels.

The lack of clarity in cross-scale institutions' relationships weakened interplays and thus impeded medicinal plant-based industry and sector development efforts. Further constraints stemmed from the sectoral bias of the resource management institutions that ignored medicinal plant resource areas. For example, institutions serving medicinal plants development across local to national scales made interventions specific to sites, species, or the sector in general (e.g., *haor*—a bowl-shaped wetland depression; floodplain, agricultural sector, healthcare sector, plant generic resources) and sidestepped the specific need for medicinal plants management. Mechanisms of projects and nested institutions were entangled with cumbersome administrations, undefined rules, and regulations, and thus lacked the needed focus and well-defined measures to promote the medicinal plants subsector.

There are flurries of policies addressing agricultural resource promotion and the conservation of environmental goods. The pertinent policies are: National Agriculture Policy (NAP) 1999; Department of Agricultural Extension—Strategic Plan; Seed Policy 1993; National Forest Policy 1994; Environment Policy 1992; and Environmental Conservation Rules of 1997. These policies failed to envision medicinal plants promotion. The Agriculture and Rural Development section of the Poverty Reduction Strategy Paper (PRSP) 2005 emphasized the creation of an environment enabling non-cereal crops (*i.e.*, fruits and vegetable), the development of non-crop enterprises (*i.e.*, livestock, fishery, poultry), and the promotion of rural non-farm economy. Medicinal plants, being a non-cereal crop as well as an off-farm produce, were not taken into account in the PRSP.

Policy level oversight is revealed as an institutional barrier. Together with the intricacies and weak interplays of the institutions and policy ineptness, it obviated the necessity for an institution to comprehensively and directly govern the subsector. The need for appropriate policies for enhancing the medicinal plants resource base remained largely unmet in Bangladesh due to the following shortcomings:

*Coordination:* In response to what is the central or apex coordinating institution for medicinal plants promotion, informants at local and sub-national levels were uncertain and revealed their confusion. A wide array of national scale intuitions without definitive roles regarding medicinal plants resource governance generated numerous bottlenecks. Key stakeholders, therefore, suggested establishing a well-defined national coordination body to exclusively address medicinal plants issues.

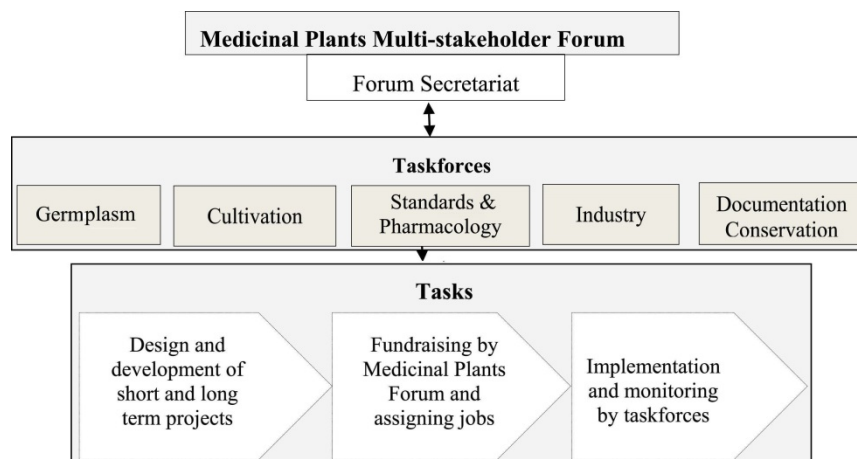
*Participation:* Key stakeholders responsible for managing resources remained loosely connected under the present institutional arrangement. The participation of sub-national institutions (district and *upazila*) appeared to be insignificant. The information flow among stakeholders across scales had been weak, resulting in poor reflections on sectoral needs, which hampered the development of the medicinal plants subsector.

*Promotion and Conservation:* A public institution with the imperative to promote the subsector is absent in Bangladesh, and yet to be established. Nested institutions and sectoral bodies (members' associations) on national and sub-national scales play trivial roles in promoting plants and plant-based resources. Value addition efforts at a primary producer level were nominal. Existing institutions were not proactive in setting up value-adding processing facilities or linking species with production of herbal medicines, cosmetics, or the healthcare sector. Such institutional ineptness discouraged local producers and growers of medicinal plants. Many medicinal plants species have become extinct, endangered, or threatened from ecosystem stresses; yet there were limited organizational efforts for conservation. To address these shortcomings, focused and concerted approaches are required, largely missing in the existing governance structure.

*Sustainability:* Sustainability of policies and strategies regarding medicinal plants governance suffers from weak and random cross-scale interplays. Entrepreneurs, aid agencies, government functionaries, and NGOs provided insights that sustainability of resources requires greater proximity and objective-oriented actions of the key stakeholders along the value chain. In order to manage medicinal plants resources effectively and sustainably, a sub-sectoral approach to governance is proposed—entailing a multi-stakeholder forum with responsibility for specific task implementation.

#### *Sub-Sectoral Forum*

Institutional analysis (based on Tools for Institutional, Political, and Social Analysis) and stakeholder consultations led to the conceptualization of a “multi-stakeholder medicinal plants forum”—similar to a proposition advocated by the Ecosystem and Livelihoods Group [31]. The following diagram (Figure 7) illustrates the proposed structure of the forum:



**Figure 7.** Medicinal plants Multi-stakeholders Forum.

The purpose of the forum would be to enable stakeholders to exchange ideas, understand each other's roles, reduce duplication of activities and, above all, chart out priorities and develop action plans towards protecting and promoting medicinal plant resources. The forum would play a pivotal role in implementing government strategy for the promotion of medicinal plants resources and address the needs of the stakeholders in the subsector. Five such task forces, constituted by institutions located at different scales, would be instrumental in operationalizing the forum. These are: (i) germplasm; (ii) cultivation; (iii)

standards and pharmacology; (iv) industry; and (v) documentation and conservation task forces. The specific roles and responsibilities of each area taskforce are listed below:

(i) *Germplasm Task Force*: This task force will involve institutions with botanical and germplasm (seeds and seedlings) expertise, namely, the Bangladesh Council of Scientific and Industrial Research, the Bangladesh Forest Research Institute, the Botanical Society of Bangladesh, and the Bangladesh National Herbarium. The core function of this task force will be to develop and maintain germplasm.

(ii) *Cultivation Task Force*: This task force will be composed of institutions such as the Bangladesh Agricultural Research Council, the Bangladesh Rural Advancement Committee, the Grameen Krishi Foundation, Intercooperation, the Department of Agricultural Extension, and the Bangladesh Forest Research Institute. The team will develop specific and organic standardized cultivation and harvesting methods and protocols, *i.e.*, establishing World Health Organization guidelines and good agricultural practices; and demonstration plots showing “how-to” before existing and potential farmers and industrial-scale cultivators. One of the important objectives of this task force would be to promote a bottom-up decision-making process, especially to enable disadvantaged and underrepresented grower communities to voice their needs and enhance bargaining capacity toward fair prices and business justice.

(iii) *Standards and Pharmacology Task Force*: The purpose of this laboratory-oriented task force will be to accomplish phytochemical analysis and determine the active ingredient in processed and semi-processed plant materials and thereby establish standards. The Department of Pharmacy (of a reputed university with state-of-the-art laboratory facilities), the Drug Administration of Bangladesh, and the Institution of Nutrition and Food Science will look after the pharmacological aspects as well as the medicinal use of the local medicinal plants. The Consumer Association of Bangladesh (CAB) will represent the interests of consumers of medicinal plants and plant products in the local healthcare system.

(iv) *Industry Task Force*: This team will focus on establishing guidelines for the manufacturing of natural products, public education, safety, and pharmacovigilance, and will explore ways of creating or expanding national and international markets for locally produced products. This task force will consist of herbal processors and industries interested in the manufacturing and marketing of natural products and traditional medicine.

(v) *Documentation and Conservation Task Force*: The primary focus of such a task force will be to identify, enumerate, and document medicinal plant species. It will also work on conserving traditional knowledge on medicinal plants and their uses. The team will make recommendations on conservation policies to the national government.

With conservation and promotional missions as delineated, the forum is poised to ensure the sustainability of medicinal plant resources. It will identify and prioritize potential short- and long-term interventions. A secretariat will coordinate the function of the forum. One of the key roles of the secretariat will be ensuring the participation of stakeholders.

## 6. Conclusions

Medicinal plants governance structure and functions in Bangladesh demonstrate weak links between institutions across scales. Examination of interplays between formal and informal organizations has revealed that the undefined roles of institutions produced ineffective governance, thereby affecting resource management policies and strategies. Sectoral institutions with a generalized programmatic

focus contributed meagerly to the needed promotion of medicinal plants resources for supporting rural livelihoods and economies. Presently, national-level institutions have nominal effects upon smaller scale actors because of their inherent weaknesses. However, a well-structured institutional arrangement establishing clear vertical linkages and effective interplays would change the rules of the game—that is, smaller scale players would have a more profound role, adding their values and voices to the marketplace. Also, with stronger national-level institutions, and their collaboration and support, leadership and organizational capacity building will be enhanced among producers and consumers at the local level.

There has been nominal coordination among developmental and rural livelihood supporting projects in terms of timeline, outputs, and outcomes. Hence, with varying lifetimes, they produced uneven results at different times. Also, a high degree of difference in project objectives did not leave much room for follow-up ventures upon termination of such disjointed projects. Time-bound preoccupations of the supporting institutions—especially donors and NGOs—hindered long-term goal setting toward sustainable governance of medicinal plants resources. Moreover, a multitude of actions by diverse partners in complicated participation processes generated disjointed effects—resulting in overwhelming role-confusion and the indecisiveness of stakeholders.

The art of resource management is associated with producing and sustaining institutional interplays. Project-based initiatives allow a comprehensive range of actors involved in the resource value chain to work together, but their successes need to be continued. Establishing a strategic management body at the national level is necessary to sustain the efforts and contributions of development partners, NGOs, and local institutions involved in development and livelihood support programs, including medicinal plant resources. A sub-sectoral approach potentially offsets some of the major weaknesses of the institutional interplays and will ensure the success of resource management practice.

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## Author Contributions

A. K. M. Shahidullah and Helal Mohiuddin contributed equally, and C. Emdad Haque contributed to add additional conceptual and editorial inputs to prepare the manuscript.

## Conflicts of Interest

The authors declare no conflict of interest.

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