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An Ecosystem Services Valuation Research Framework for Policy Integration in Developing Countries: A Case Study from Nepal

Ram Prasad Acharya [1,*], Tek Narayan Maraseni [1,2] and Geoff Cockfield [1]

[1] Centre for Sustainable Agricultural Systems, University of Southern Queensland, Queensland 4350, Australia; Tek.Maraseni@usq.edu.au (T.N.M.); Geoff.cockfield@usq.edu.au (G.C.)
[2] Northwest Institute of Eco-Environment and Resources, Chinese Academy of Sciences, Lanzhou 730000, China
* Correspondence: ramprasad.acharya@usq.edu.au or ram.pacharya@gmail.com

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Abstract: Forest ecosystem services (ES) valuation research has increased exponentially in recent years, and scholars accept that such research could be useful in reshaping governments' policies. Despite such scholarly efforts, the research outcomes have had limited application in actual policies and plans. This study explores reasons why ES valuation research recommendations are not reflected in policy processes and proposes a research framework which, when appropriately applied, would lead to the adoption of research findings. Literature review, semi-structured expert interviews (N = 29), and a workshop (N = 2), were used to achieve these objectives. Experts expressed that limited stakeholder engagement is the key factor hindering incorporation of ES research outcomes in policies and plans. We developed a framework that comprises four major components (inputs, actors, outcomes, impacts) and sets out the seven major steps involved in implementing this framework. Effective engagement of relevant stakeholders in each step is critical to integrate the ES research outcomes in policy and plans although this will demand a lengthy timeframe and a high investment requirement. Such engagement would create an environment of trust that enhances the acceptability of research outcomes among stakeholders. The acceptability of the research outcomes can increase ownership leading to more informed decision making, and ultimately yield desired outcomes in ES conservation.

Keywords: forest ecosystem services; research; framework; policy adoption

1. Introduction

Forests, the Earth's largest terrestrial ecosystems, provide a myriad of important services to human society. Forest ecosystem services (hereafter ES) play a crucial role in sustaining people's livelihoods, the environment, and the economy [1,2]. Many ecosystems including the forests across the globe are degrading despite significant conservation efforts; the extent of this depletion is more pronounced in developing countries [3–6]. Limited knowledge about the values of ES and poor adoption of findings in the decision-making processes are the main reasons for this depletion.

In recent years, ES valuation research has proliferated at an exponential rate. One of the objectives of ES valuation research is to include both use and non-use values in the policy process. Many seminal works [7–9] and scholars [10–13] have identified the role of ES valuation studies in informing and reshaping policies. Some studies have attempted to identify the level of influence of ES valuation studies' recommendations in policy improvement in high income countries such as Australia, New Zealand, USA, and the European Union, including Germany [14–19]. Despite increased scholarly

efforts, little research has been conducted to explore the use of research outcomes in actual policy and management decisions, especially in low-income countries.

Some studies have explored the state of integration of ES values in policies and plans and have acknowledged multiple attributes that can govern the integration of research recommendations into policies and plans. Common attributes include proper communication with and meaningful participation (critical engagement) of relevant stakeholders throughout the research process [15,20–22], and capacity building including training of policymakers [23]. However, no previous studies have investigated the reasons behind the limited integration of outcomes of ES research in policy and plans focusing on low-income countries [13].

Drawing on insights gained through one-on-one expert consultations, and in workshops at local to national level in a low-income country, Nepal, this paper explores why ES research findings have not been incorporated into policies and plans. We propose a research framework for policy adoption of ES research outcomes in developing countries.

An understanding of the state of ES research and resultant policy uptake can contribute to the design of future ES research in such a way that policies acknowledge the findings and mainstream the outcomes. Potential contributions include: (i) it helps in designing appropriate research frameworks in developing countries; (ii) it creates an in-depth knowledge base highlighting the importance of ES to relevant stakeholders that can be helpful in improving livelihoods of forest-dependent communities; (iii) study findings help reform policies and plans of the natural resource management sector to ensure sustainable management of the forests; (iv) it will help to refine the national accounting system of the forestry sector so that the contribution of forestry can be better visualised by the different stakeholders including policymakers.

2. Materials and Methods

2.1. Selection of Case Study Site

Nepal was chosen for the case study site from the low-income countries. Nepal, a beautiful mountainous country with unique and diverse geography, hosts 118 different types of ecosystems and natural habitats and harbours many critical forest ES, ranging from provision of timber, firewood, fodder and conserving soil and water to climate-related services [24,25].

The country is relatively small, occupying about 0.1 percent of the global area, but ranks 25th in terms of biodiversity [24]. It possesses 3.2 percent and 1.1 percent of the world's known flora and fauna, respectively [26,27]. Similarly, Nepal is renowned for community-based forest management modalities globally, with more than 2.5 million hectares of forests under the community-based forest management (CBFM) system [28]. Nepal has witnessed many shifts in policies and plans, from state control to community-based management, and faces serious threats to its rich ecosystems. Moreover, Nepal recently inaugurated a federal political structure authorising the seven provincial states to manage their existing CBFM modalities. There is growing fear among forest users that this may de-establish the CBFM system and further degrade forest ES [29].

2.2. Data Collection Methods

We employed both primary and secondary sources for data collection. Systematic reviews of published literature [3], syntheses of policies and plans related to forest ES, expert consultations, as well as stakeholder workshops, were the main methods for data collection. We employed qualitative methods such as content analysis, expert consultation and workshops. A list of the pertinent literature that deals with how to incorporate research outcomes in policies and plans is provided in Supplementary Material 1.

2.3. Expert Consultation

Twenty-nine semi-structured in-depth interviews were conducted one-on-one with policymakers, researchers, academics, government officials, and persons working in ES conservation and management and their details are provided in Table 1. Policymakers and other respondents were chosen since they represent the government and public institutions and, at the same time, they were engaged in ES research and publications. We devised a semi-structure questionnaire based on a review of the extant literature on ES. The questionnaire consisted of two sections. The first section records personal data: name, gender, age, education level, affiliation, experience in ES research and publications, and the major area of expertise of the respondents. The second section of the questionnaire covers knowledge/gaps in ES valuation at an organizational and individual level, application of research knowledge in management and decision making, methods applied to conduct the research and a number of policy recommendations. The section also investigates why more of the research recommendations have not been incorporated into the policies/plans and steps and issues that can be crucial for policy adoption (see Supplementary Material 2 for details).

Table 1. Types of experts, institutions and expertise consulted during the consultation (N = 29).

Affiliation	Types of Expertise	No. of Respondents
Government (9)	Biodiversity/Wildlife	1
	Economics	-
	Forestry	4
	Soil conservation	3
	Research/policy	1
Non-government organisation (12)	Biodiversity/Wildlife	2
	Economics	3
	Forestry	4
	Soil conservation	1
	Research/policy	2
Academic (3)	Biodiversity/Wildlife	1
	Economics	1
	Forestry	-
	Soil conservation	-
	Research/policy	1
Private (5)	Biodiversity/Wildlife	1
	Economics	1
	Forestry	1
	Soil conservation	1
	Research/policy	1

Table 2 provides socio-demographic information (gender, age, education, expertise, experience and number of publications) of the experts. Overall, the median age of the respondents is 52 years. The majority of the respondents had attained a PhD degree in forestry or environmental economics; the second highest number had a masters level education in forestry. The respondents had an average of more than 25 years of experience in the fields of biodiversity, forestry, economics and soil conservation. Moreover, all the participants were familiar with the concepts of ES and had been involved in planning, implementation and research on ES-related activities.

Table 2. Demographic characteristics of the respondents.

Demographic Characteristics	Respondents	Research Outcomes Adoption %
Gender (number of respondents)	Male (26)	15
	Female (3)	13
Age (median age year)	52	-
Education (number)	PhD (16)	16
	Masters (12)	12
	Graduate (1)	9
Expertise	Biodiversity/WL (5)	14
	Economics (5)	12
	Forestry (10)	12
	Soil conservation (5)	17
	Research/policy (4)	8
Experience (year)	25	-
Number of publications (average and range)	25 (8–195)	-

2.4. Workshops

The research framework was developed by first reviewing relevant literature, then consulting with local, regional, national and international level experts, and finally an in-depth analysis of the information. Then, two day-long workshops (N = 2) were conducted at national and regional levels to refine and receive feedback on the framework developed. The first workshop was organised in Kathmandu, where many policymakers such as members of national planning commissions, departmental heads, members of the President Chure-Tarai Conservation and Development Board, Academia and other experts were present. In the workshops, we presented the state of ES research globally, categorised the research gaps in forest ES, and speculated on reasons for non-adoption of forest ES research recommendations. We also shared the proposed research methods to obtain feedback on how forest ES research recommendations could be better integrated into policies and plans. The second workshop was organised at the Institute of Forestry, *Hedauda*, where members of the Bagmati Province Planning Commission, the Dean of the Institute of Forestry, faculty members of the Economics, Environment, and Botany Departments and students attended. During the workshop, we shared the preliminary findings from the literature about the reasons for not adopting ES research outcomes in policies and plans and elicited from participants the key challenges they perceived in ES research. The researcher presented the draft preliminary framework to receive participants' feedback. After intensive discussion, these workshops refined the draft research framework.

2.5. Data Analysis

The data were analysed using qualitative analysis techniques such as thematic/content analysis, coding and interpretation techniques. We followed the stepwise techniques of content analysis following Poudyal, Maraseni [30], which consist of categorisation of experts' opinions and views, labelling them based on the content. Qualitative data analysis software NVIVO v11 was used to analyse the major steps that the experts emphasised during their interviews. The views expressed by the experts regarding the reasons behind the lack of integration of research outcomes in policies were categorised into five major groups: (i) limited multiple stakeholders' engagement; (ii) lack of proper dissemination mechanisms; (iii) no actual reflection of on-the-ground reality; (iv) lack of appropriate and sound research methods; (v) research conducted in isolation.

2.6. Framework Finalization

During the workshop, we drafted a research framework that consists of four major components (inputs, actors, outcomes, impacts) and detailed the seven major steps in the research process: (i) conceptualisation, (ii) planning, (iii) data collection, (iv) triangulation, (v) analysis and reporting,

(vi) policy recommendation, and (vii) policy adoption. The workshop participants also provided some general guidelines for each step. After the workshop, we documented all the suggestions of participants and experts, and then shared with them to confirm: (i) that their views are clearly reflected in the framework; (ii) the explanation for each step is satisfactory. Their feedback was incorporated when finalising the final framework and its key explanations.

3. Results and Discussion

3.1. Reasons for Non-Adoption of Forest Ecosystem Services Research

Experts working in ES research identified many reasons that hinder the research outcomes from being incorporated into the ES policies and plans. Four out of five respondents suggested that limited stakeholder engagement is the key factor hindering incorporation of ES research recommendations. The second main reason identified was the lack of appropriate mechanisms for disseminating outcomes of ES research. Figure 1 presents the reasons suggested for why ES research recommendations are not incorporated into forestry-related policies and plans.

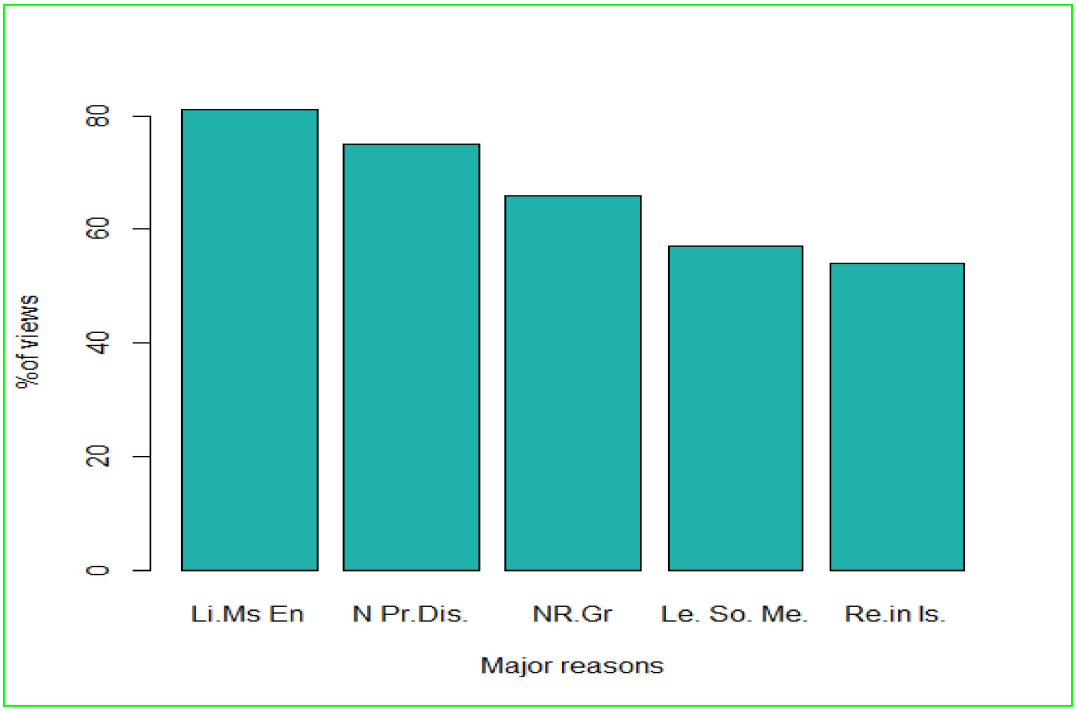

Figure 1. Reasons for non-adoption of forest ecosystem services research outcomes in Nepal; Li. Ms En. = Limited Multi-stakeholder engagement; N Pr. Dis. = Lack of proper dissemination mechanisms; NR Gr. = No actual reflection of on-the-ground reality; Le So Me = Lack of appropriate and sound methods adopted; Re. in Is. = Research conducted in isolation.

Many researchers report similar findings in relation to ES research in Nepal and in other countries about stakeholder engagement. For example, Ojha and his team [31] emphasized that strong engagement of stakeholders for collaborative enquiry is essential for influencing better policy outcomes in Nepal; they argue that this is still a crucial issue in the policy–research interface. Similarly, some authors [15,32] highlighted that critical stakeholder engagement is one of the main issues in the policy process, while another study [33] stressed that poor access and the limited capacity of the stakeholders to be involved in the policy process is the key issue to be addressed.

Twenty-one respondents identified the lack of a proper mechanism to disseminate research outcomes as the key reason hindering uptake of ES research findings in the policies and plans in Nepal. Global studies support this finding. For example, Keenan and his team [17] explore the key

impediments to integration of the ES research outcomes in the context of Australia; they argue that no appropriate mechanism has been devised to encourage uptake of ES research outcomes. Similarly, three out of five respondents agreed that lack of appropriate and sound methods of data collection impede the integration of relevant ES research into policies and plans. They further elaborated that ES research requires reliable and trustworthy data to convince the policymakers, concurring with the findings of other scholars who advocated for presentation of pertinent and reliable data to persuade the policymakers [22,32,34].

3.2. Proposed Framework of Research in Forest Ecosystem Services Research

The proposed research framework consists of four major components and seven major steps. In each step, the inputs, actors involved, outcomes and the expected impacts are also detailed in the framework (see Figure 2).

3.2.1. Conceptualisation

The conceptualisation of research needs, and identification of the problems comprise the first key step in ES research. Most of the experts held that the research needs/problem identification should be carried out among a set of stakeholders such as researchers, government officials, rights-holders/stakeholders, forest users and experts to make research outcomes able to be adopted in the policy process.

Many researchers globally acknowledged that who leads and who is involved in the ES research conceptualisation is the key step for integration of the research outcomes into policies and plans [15,21,22,35,36]. In the conceptualisation of the ES research, there is a need to brainstorm the potential research and policy actors while developing the ES research problem. If the ES researcher makes an effort to engage a range of stakeholders from local to national level including forest users, representatives of different sub-groups, users, executive committee members, local authorities, local leaders, regional managers, national stakeholders and rights-holders during the process of conceptualisation, this step can certainly underpin the credibility of the research, provide opportunities for better reflection of context and visualise the problems and issues [15,21,37]. In addition, the engagement of stakeholders in conceptualisation can aid the in-depth analysis of the problems from many angles and empower stakeholders in the forest ES-related issues [20,33,38].

Before finalisation of the problem, the researcher should make a field visit to assess the on-the-ground reality. One of the experts stressed that the field visit is necessary to communicate the whole process to the local stakeholders so that local people can formulate and collaborate in the development of the research problem and also own the research processes from the very beginning.

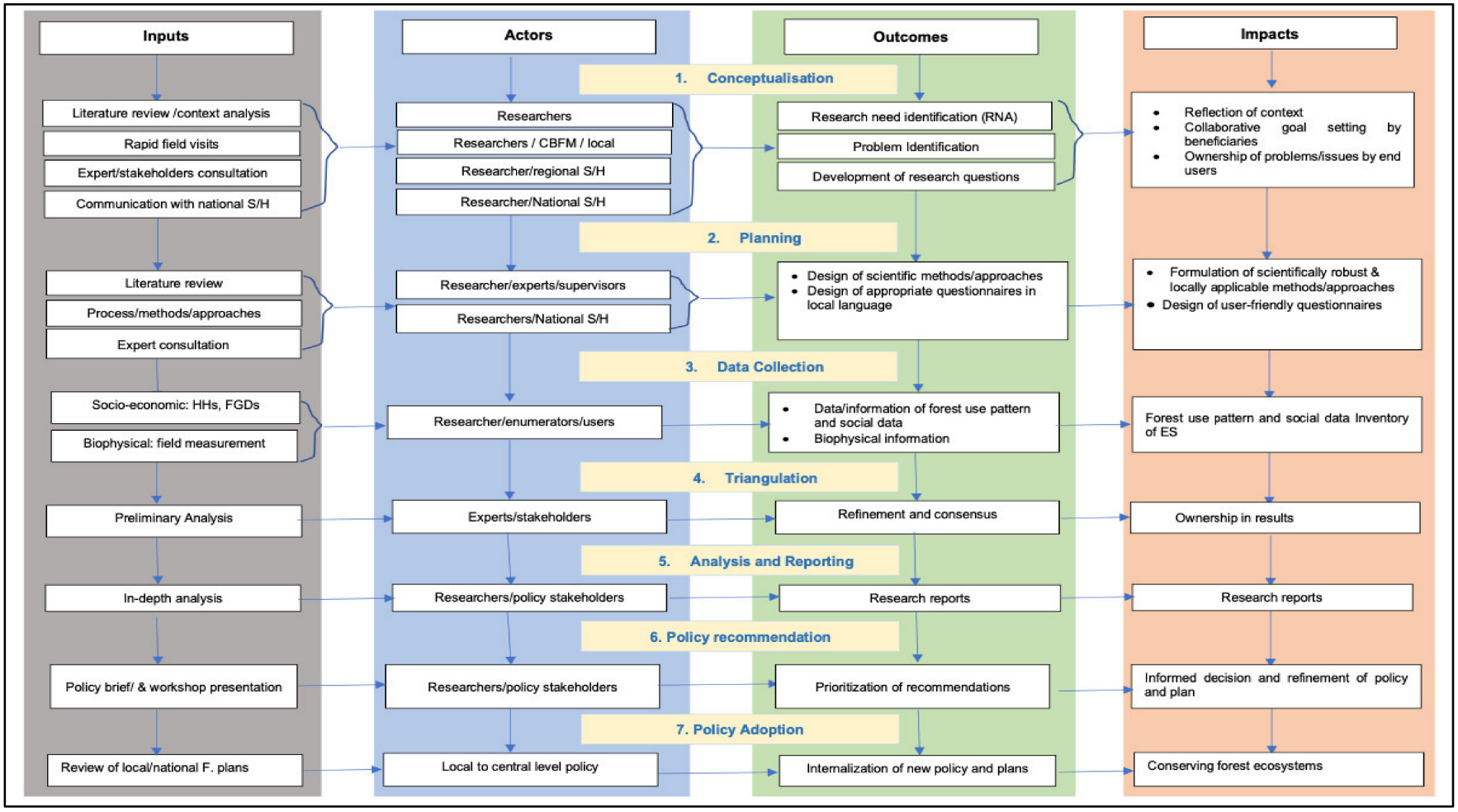

Figure 2. Proposed framework of ecosystem services (ES) research outcomes for policy adoption in developing countries. S/H: Stakeholders; HH: Households; FGD: Focus Group Discussion; F. plans: Forest management plans; CBFM: Community based forest management.

3.2.2. Planning

The second step of the framework is planning the ES research. The planning process comprises mainly the development of the research approach, the methods, and the processes. Experts in Nepal recommended that a range of stakeholders needs to be engaged to make the research process trustworthy and transparent. They reasoned that the potential stakeholders for the planning step should include researchers, experts, forest officials, political opinion leaders, local authorities, representative of forest users, rights-holders and representatives of the media.

Scholars globally acknowledge that ES research needs to involve various stakeholders in the planning process [20,32,39,40]. How we can engage different stakeholders in the planning process is the key issue in the ES research. Paudyal and his team [41] stressed that this can be achieved either through regular meetings and interactions, such as national workshops or one-on-one consultation meetings among the stakeholders. Experts recommended a national level stakeholder workshop as an effective avenue where researchers can share approaches, methods, and key processes of the ES research. This workshop would ensure improved communication among the key policy-level players and practitioners and could be helpful in bringing about a consensus on the methods to be used among stakeholders and rights-holders. Moreover, this type of consultation may generate a sense of ownership among key stakeholders and scientists on the process, approaches and methods of the research, which would ultimately improve the quality of the research processes [40].

Some researchers identified a clear gap in empowering the stakeholders in the ES research process [33,42]. These studies suggested that stakeholders from the local level, for example, forest users and executive members and local keypersons working in forest management and ES and rights-holders, as well as experts, should be involved in the process of any ES research planning process. If the ES research involves these stakeholders in the design and development of the approaches and methods, this can be helpful in formulating scientifically robust and locally applicable methods. Furthermore, the research can develop a questionnaire and other tools in a local language so that it is easy to explain the issues at the local level.

3.2.3. Data Collection

One of the crucial steps in ES research is to generate reliable data and persuade policymakers about the value of the ES. Respondents expressed that ES research demands both biophysical and social information to estimate the reliable economic contribution of forests. They added that all ecological data, such as forest condition, canopy cover and soil erosion, are examples of biophysical data, while socio-demographic information, for example, household size, demand for forest services, livestock holdings, and income are social information.

Prior studies agree that reliable data are required to persuade the policymakers about the ES research outcomes [31,34] and other scholars acknowledge that ES research demands both social and ecological information to produce acceptable ES research outcomes that are applicable to policy [22]. Records of ES use patterns, especially provisioning services, are, however, not adequately recorded in the developing countries [39,43]. Moreover, regulating services such as water quality improvement, flood reduction, and soil conservation from forest management require complex and long-term observations, records and data. These types of data are not easily available in data-poor regions such as Nepal [44–46]. Therefore, researchers in developing countries must rely on social and participatory methods of data collection.

Experts indicated that due to the limited availability of reliable biophysical data, the research team must employ participatory data collection methods from national to local level in developing countries. For this, we need a trustworthy network at national, regional, and local level. The research team can and should develop good relationships at local level so that local forest users can share real information related to ES resource use. Experts further suggest that this process can be fostered either by building good rapport with local people or by hiring local enumerators to collate the social information, or both. Many regulating services require a body of long-term biophysical data. For example, if we want to

evaluate the soil retention benefits from forest conservation, we need to find soil erosion rates and quantify the soil nutrients in the area over the long term. These types of information are usually not available in developing countries like Nepal. However, soil conservation is one of the most important values and, therefore, should not be neglected. These values might have to be inferred from some other local practices, methods and data [47].

Social data collection methods (for example, household surveys and focus group discussions) are among the key methods that can be used where the ES use patterns have not been adequately recorded. These methods encourage social interactions and have potential for positive direct communication with local level stakeholders including local forest users [34]. The use patterns among particular local sub-groups could also be different and depend on a range of factors [48,49]. Thus, using stratified random sampling, researchers should collect information on the ES use among different sub-groups focusing on proximity to a forest, socio-economic status and forest management modalities in the local area [50].

3.2.4. Triangulation

Triangulation is the process of validating data collected from various sources such as household survey, focus group discussion, records from forest users and other records from forest offices. Triangulation helps to ensure high quality, transparent and reliable data, from trustworthy sources. Multiple data collection techniques and data sources can be used to generate high-quality data. For this, the data generated should be triangulated, from local to national level, to ensure the results are credible.

Experts suggest multiple methods to triangulate ES use data at local level in the context of Nepal. For example, if we assessed the timber collection and use through a household survey of each household, the household information on timber use at the local level could be verified with executive members and minutes/records of the forest users' committees. Other possible ways of triangulation could include focus group discussions at local level to elicit the same information or triangulate from district forest offices' records. Some biophysical data are not easily available and could not be verified due to lack of recorded data. To estimate the flood reduction (FR) benefits at household level, for instance, there would be no data available at the local level. In many cases, scholars calculate the FR value through contingent valuation methods [47,51,52]. In such situations, we can validate the data using the damage cost method, to verify the reliability of the willingness to pay of the users.

Such triangulation can be helpful in refining the available data. This could be useful to achieve consensus among the results and can increase the ownership of the findings among the stakeholders. If the data are reliable and results are produced on a consensus basis, this could create a trust situation that would convince the policymakers and might lead to adoption in policy of the ES research outcomes.

3.2.5. Analysis and Reporting

The data analysis involves in-depth collation, tabulation, synthesis and interpretation of both biophysical and social data. ES research demands much sophisticated software and hardware to analyse the data. These methods should be both easy to understand and cost effective. The data should be analysed and presented in an appropriate way so that the policymakers and other stakeholders can trust the outcomes of the research.

One way of making the results trustworthy and achieving consensus is involving many policymakers and other potential stakeholders in the in-depth analysis. While it is time-consuming and costly, this requires intensive and extensive interactions and dedication of the researchers [53], as practised in our research. If the research process ensures the sincere engagement of the stakeholders even in data analysis and reporting, this can create a trustworthy environment. Such engagement can build ownership in the research outcomes among policymakers and other stakeholders; however, it is not always possible to involve them in the process because they are always busy with many other activities. In addition, many data analysis processes demand technical and specific expertise in which there is no possibility to involve stakeholders and policymakers in every step. In such

cases, the researcher needs to share at least the process of data analysis, in order to help convince policymakers and resource managers of the benefits of the potential research outcomes [53–55]. Several rounds of restatement of the outcomes among the stakeholders can increase the chances of acceptability of the outcomes by the policymakers [32].

The experts opined that ES researchers should decide how the results should be used. If results are targeted to policy inferences, there should be a detailed analysis and they should produce accurate outcomes [21]. The results could be compared with the national gross domestic or highly influential communicable indicators so that policymakers can compare the investment with the potential losses and gains [21,36]. In addition, the outcomes should be reported in a pictorial mode as graphs, histograms and other appealing forms to convince the local people.

The researchers often face two types of criticism from the stakeholders. First, research outcomes are not properly disseminated among the stakeholders, including policymakers and/or managers. Second, most of the research outcomes do not reflect on-the-ground reality. That is probably the main reason why policy players often reject the outcomes of the ES-related research in developing countries.

3.2.6. Policy Recommendations

Based on the outcomes of the analysis carried out in this study, ES research can offer a set of recommendations. Respondents emphasised that ES research recommendations should be categorised based on cost and required resources for implementation, the urgency of the research outcomes, and a timeframe to implement such recommendations. To implement the ES research recommendations properly, we should identify the role of different stakeholders including the role of the private sector which is engaged in ES management. If we prioritise the recommendations, clearly stating the roles of stakeholders, the likelihood of ES research adoption is high.

These recommendations could be presented in several different forms such as policy briefs, workshop presentations or in the form of journal articles based on the target audiences. If the recommendations are targeted to particular scientific communities, the policy recommendations could be published in high impact journals, in appropriate, peer-reviewed publications. Similarly, if the target of the recommendations is policymakers, the most effective recommendations could be policy briefs or policy-related presentations. Experts recommended that effective communication should be established within every step 1–5 (Conceptualisation, Planning, Data collection, Triangulation, Analysis and reporting) so that policymakers can take up the policy recommendations. They added that a policy brief could be effective if there were numerical and easily understandable indicators. Therefore, we need to use maximum relevant figures and graphs in the policy briefs.

While the recommendations are targeted to local level users, the recommendations could be incorporated in action plans. The content and language of the recommendations point to another major issue when targeting local users. Complex, scientific jargon and heavily weighted language can impede the uptake of the ES research outcomes [56,57]. Pictorial presentation, use of different colours for quantification, and using the local language could be helpful in persuading people to adopt the action plans [58]. For example, if the researchers would like to adopt the conservation or ecosystem restoration projects in the Chure and Tarai landscape in Nepal, an action plan should be formulated in *Maithli, Bhokpuri, Abadhi* and *Tharu* languages, so that the local people can appreciate and integrate the recommendations.

The experts also suggested that both the process and venue of policy discussion could impact the integration of the policy recommendation. One recent study conducted in Nepal on the science–policy interface concluded that policy processes were often led either by government, civil society or donor agencies. These agencies are rarely able to agree with each other and policymakers mostly ignore their recommendation although the recommendation could be very useful [31]. To overcome this impasse, the researchers can facilitate several small-group discussions rather than organising one big meeting that includes many stakeholders. If the deliberations are conducted in small groups and presented in calm, neutral language, a small group can discuss and take up recommendations, which in turn can

help inform decisions, policy and plan refinement and prioritisation of scarce resources. However, such groups should still include all relevant stakeholders.

3.2.7. Policy Adoption

Based on the ES research information and recommendations, decisionmakers and resource managers can compare the different recommendations and can select the appropriate recommendations. The recommendations can be integrated into policy and plans through inclusion in policy, plans or institutional arrangements. Similarly, the policies or plans are typically operationalised and the interventions could be designed as some form of regulation or incentives proposed in a variety of different forms.

Our experts indicated that the policy adoption could be on two different scales. First, it could be internalised at the national level, where the policymakers can review the relevant forest and other land use policies and plans and accordingly initiate the internalisation of the recommendations by improving, reframing, or redirecting these documents in line with the new recommendations. Second, regional and local level management bodies can review and formulate actions/activities at landscape or management unit levels as per the recommendations to restore or enhance the impaired ES that was also reinstated, as suggested by Bagstad and Johnson [59].

Some of the challenges to internalise the ES research outcomes in policy and plans are a mismatch of the timeframe, availability of windows of opportunity and the mechanisms adopted in the communication of such recommendations [22,32]. Likewise, limited regular monitoring and evaluation of the policy adoption process further hinders integration of the research outcomes in the context of the developing countries.

4. Conclusions

The volume of forest ecosystem services (ES) valuation research has expanded at an exponential rate and its role in informing and reshaping policies has been unanimously accepted by scholars. This study finds that ES researchers do not follow the fundamental steps that can help to incorporate the outcomes of research in policies and plans and that this is mainly due to limited research resources. In this study, we identified seven major steps: (i) conceptualisation, (ii) planning, (iii) data collection, (iv) triangulation, (v) analysis and reporting, (vi) policy recommendation, and (vii) policy adoption, which, if followed appropriately by the researchers can add value if incorporated into the research recommendations in the policy process in Nepal and developing countries.

Application of the deliberative and participatory approach in each step is critical. Although this demands a long-term and high investment to generate policy-relevant research outcomes, these steps are unavoidable to render the environment for research outcomes acceptable. If we follow these steps, the outcomes can create a trustworthy environment among the stakeholders, a feeling of ownership of the process, and acceptance of the results by policymakers. This can lead to informed decision making, and ultimately generate sustainable "win–win" scenarios for all stakeholders.

The outcomes of forest ecosystem research should match the level and objectives of target audiences. A proper communication strategy, timing, and language of the research outcomes need to be considered while aiming to influence policy through results of ES research. For example, if we wish to incorporate ES recommendations in forest management plans at local level, those recommendations should be site-specific and delivered in a local language. Likewise, if the target is for broader audiences and policymakers, a well-developed communication and outreach strategy is a must. Such strategies should be able to utilise diverse media platforms, such as traditional and social media, that allow for both widespread and targeted communication of the results.

Supplementary Materials: The following are available online at http://www.mdpi.com/2071-1050/12/19/8250/s1, Supplementary Material 1: Some relevant reviewed literature for the adoption of research outcomes in policies and plans; Supplementary Material 2: Checklist for national level expert consultation.

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