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# Construction Aggregates and Environmental Policy Integration in a One-Party State: The Case of Hoa Binh, Vietnam

**Paulina Schiappacasse [1,*], Bernhard Müller [1,*], Le Thuy Linh [2] and Peter Wirth [3]**

[1] Faculty of Environmental Sciences, Dresden University of Technology, 01062 Dresden, Germany
[2] Faculty of Environmental Sciences, VNU University of Science, Vietnam National University, 10000 Hanoi, Vietnam; leha@hus.edu.vn
[3] Research Area Landscape Change and Management, Leibniz Institute of Ecological Urban and Regional Development, 01217 Dresden, Germany; p.wirth@ioer.de
* Correspondence: paulina.schiappacasse@tu-dresden.de (P.S.); bernhard.mueller@tu-dresden.de (B.M.)

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**Abstract:** In fast growing economies, rapid urbanization generates high demand for construction aggregates in the rural hinterland of cities. Their extraction often causes negative repercussions on the environment. In Vietnam, the central government has made strong efforts to incorporate environmental objectives in the aggregate mining sector, and, in a one-party state, it has powerful means to implement its policies. Nevertheless, adverse environmental effects of aggregate mining are visible throughout the country. Against this background, the purpose of this paper is to identify barriers for environmental policy integration in a one-party state. The aggregates industry in Hoa Binh Province, located in the hinterland of the fast growing capital Hanoi, is taken as a case. Methods of the study, which was conducted between 2015 and 2019, include literature review, document and data analysis, interviews, group discussions for information collection and validation of results, and site visits. Six environmental policy integration barriers are derived from the literature. They form the conceptual basis for explaining difficulties of environmental policy implementation and integration in the concrete case. The study demonstrates that the following factors provide a viable concept for analyzing deficits of environmental policy integration in a fast modernizing one-party state: (a) the prevalence of top-down approaches with insufficient trigger-down effects, (b) the predominance of socioeconomic over environmental objectives, (c) weak incentives to improve environmental performance, (d) fragmented environmental planning and implementation, (e) weak institutional control mechanisms on lower levels of government, and (f) compliance oriented public participation and deficient compensation mechanisms. These are potential entry points for coping with environmental challenges of growth oriented sector policies.

**Keywords:** construction aggregates; environment; environmental policy integration; policy implementation; one-party state

## 1. Introduction

Construction aggregates, i.e., sand, stone, and gravel, are among the most mined materials globally. This is especially true for fast urbanizing countries such as those located in Asia. Aggregates are the essential raw material used to construct and maintain buildings and infrastructure, and currently the Asia-Pacific region has the largest demand for these minerals, with countries like China, India, Indonesia, Vietnam, and Malaysia recording the most rapid increases over the past few years [1].

One of the main problems challenging the construction aggregates industry is related to the direct environmental repercussions of mineral extraction in the rural hinterland of cities, such as

landscape alteration, conversion of land use, soil erosion, and biodiversity loss, as well as noise and dust production. These facets of environmental degradation usually cause serious conflicts with other sectors, such as agriculture, forestry, water supply, and tourism development [2]. These challenges call for new strategies related to the construction aggregates sector. "Responsible mining" is the key term to mark the growing concern of national policy agendas for sustainable development [3]. As a reaction to the high resource consumption of urbanization, many governments, especially in Asian countries, have put environmental concerns more prominently on their agendas [4].

Vietnam is one of the positive examples. Since the introduction of political reforms in the 1980s, the country, a prominent one-party state, has experienced steady economic growth coupled with strong industrialization and urbanization [5–7]. As a response to this pattern of development, the country adopted a more profoundly "sound" environmental policy framework [8]. It included the issuance of the National Action Plan on the Environment and Sustainable Development in 1991, the enactment of the Law on Environmental Protection in 1993, updated in 2014, the creation of the Ministry of Natural Resources and Environment (MONRE) in 2003, the Biodiversity Law in 2008, the Law on Environmental Protection Tax in 2010, and the Green Growth Strategy in 2012. Moreover, Vietnam, as an "active and responsive" member of the United Nations, makes significant efforts to implement UN sustainable summit commitments, e.g., the Sustainable Development Goals [9].

However, there are many signs that the ambitious environmental agenda of the country is not fully backed by an adequate institutional framework, and that a number of environmental policy-implementation gaps still exist, although the institutional and strategic preconditions of a one-party system, according to popular notion, might suggest the contrary [4,8,10]. For example, the country made steps to decentralize natural resource decision-making when the national government, in 2005, handed over the responsibility for licensing the mining of construction aggregates to provincial authorities [11]. Since then, the provincial Departments of Natural Resources and Environment (DONRE) have been responsible for managing the aggregate mining sector, whereas MONRE is responsible for all other types of minerals. However, what was widely seen as a national milestone and test for strengthening regional responsibilities to promote the sustainable management of resources ended in a proliferation of mining licenses, causing strong environmental concerns on the national and local levels.

Nowadays, according to the 2013 Constitution of the Socialist Republic of Vietnam and its Article 43, every citizen "has the right to live in a clean environment and the obligation to protect it" [12]. Article 63 states in its Clause 1 that the State is responsible for environmental protection policies, managing and using natural resources in an efficient and sustainable manner, and conserving nature and biodiversity. According to Article 53, natural resources, such as land, water, and mineral resources, "are public property, owned by all the people, and represented and uniformly managed by the State" [12]. At the same time, the polluter pays principle applies, as Clause 3 of Article 63 stipulates that "organizations and individuals that cause environmental pollution, natural resource exhaustion, or biodiversity depletion shall be strictly punished and shall rectify and compensate for damage" [12]. These provisions have been transformed into national legislation. Thus, mining companies, including those of the construction aggregates sector, must comply with licensing procedures for receiving the right to undertake mining activities. Through such procedures, as well as through respective socio-economic development strategies and plans, the State administration shall ensure the efficient use of land and natural resources and compliance with the requirements of environmental and nature protection while encouraging economically viable operations [13].

Against the described background, the objective of this article is to identify and analyze barriers for environmental policy integration and, more specifically, institutional implementation challenges related to the "responsible" extraction of construction aggregates [3]. The research question under discussion is: Which institutional factors explain deficits of environmental policy integration in a one-party state? The construction aggregate sector in Vietnam is taken as a case. Field research was conducted in Hoa Binh Province, located in the hinterland of the fast growing capital, Hanoi.

In order to achieve these objectives, the article is structured as follows: After the introduction, barriers for environmental policy integration and implementation in a one-party state are discussed, and a related taxonomy is derived. Then, the materials and methods used in the research, and the environmental policy framework in Vietnam, are presented. This is followed by an analysis of institutional factors that limit environmental policy integration in the construction aggregate mining sector. Finally, in the discussion and conclusions, options to address the identified barriers are pointed out.

The article is relevant for those interested in policy-implementation gaps and factors that limit environmental policy integration in the construction aggregate mining sector in fast-growing countries with one-party systems. It may contribute to the discussion about environmental policy integration under different framework conditions, and inspire us to think about new ways to overcome barriers and to make aggregate mining more environmentally friendly.

## 2. Theory: Towards a Systematization of Barriers for Policy Integration in a One-Party State

Environmental policy integration deficits and policy-implementation gaps have been widely discussed, and the literature suggests that many environmental policies, once adopted, have not been implemented as envisioned [14–19]. For example, the implementation of national environmental protection strategies often falls behind expectations due to limited local capacities to implement and control respective regulations locally. Moreover, national governments' sustainable development agendas do not always find followers at the regional and local levels [20]. Critical authors also point to the experience that topics of sustainability and environmental improvement are prone to be turned into symbolic policies [21–24]

These aspects may pose severe challenges for successful environmental policy integration, i.e., "the incorporation of environmental objectives in non-environmental policy sectors" [25]. Transferred to the above described context, this means that, despite the existence of well-grounded environmental objectives on the national level, these may not be successfully implemented and respected by other sector policies, e.g., the construction aggregate sector, on the regional and local levels.

As Hudson, Hunter, and Peckham argue, "policies do not succeed or fail on their own merits" [26]. Hupe and Hill [27] argue that, today, earlier assumptions are outmoded. For example, this applies to the assumptions that intentions precede action, goals determine instruments, and instruments determine results. In contrast, they point to recent literature that has acknowledged that it is important to understand the policy context in a new way. Factors "that shape and influence implementation are seen to be complex, multifaceted, and multileveled with public policies invariably resembling 'wicked problems' that are resistant to change, have multiple possible causes, and have potential solutions that vary in place and time according to local context" [26].

One important factor that contributes to the success or failure of policies is related to the governance system within which the development and implementation of policies take place [28]. Governance is understood here as "the sum of many ways that individuals and institutions, both public and private, manage their common affairs" [29]. For example, it can be argued that within authoritarian regimes, including one-party states, forms of policy-making and policy implementation differ considerably in many aspects from those in pluralistic and democratic societies.

Williamson and Magaloni (2020) conclude that, although during the past two decades there has been an "explosion of research on authoritarian regimes", much remains to be still explored to open the "black box of authoritarian policy making", i.e., "how policy is made under authoritarian rule, and how institutions . . . shape the policy process" [30]. They argue that "policy making in authoritarian regimes, as in democracies, is inherently messy and conflictual. The great powers of autocrats do not necessarily imply a quick and efficient process of selecting policies" [30].

Following Ahlers, Hebere, and Schubert (2015) and their work on the adaptation of national policies on the local level, similar conclusions can be drawn regarding effective policy implementation and environmental policy integration [31]. For example, it is important to note which factual rights and

obligations rest with regional and local level institutions, how they influence policy implementation and integration, and to which extent and how the general public or at least representatives of the civil society are involved in decision-taking.

In the two most prominent authoritarian one-party regimes undergoing rapid and successful economic transformation, China and Vietnam, two usually contradictory objectives seem to coexist in a complimentary way: the objective to assure stability of the politico-administrative system, and the objective to maximize economic growth at the same time. Whereas, in other one-party states, policy makers often opted for the first objective to prevail, and finally risked the collapse of the whole political and economic order, China and Vietnam understood the two objectives as inter-dependent and linked them in a successful way [32]. Both countries have introduced ambitious economic reform programs as well as certain decentralization and participation strategies during the past decades.

In Vietnam, the Communist Party clearly dominates political decision-making. Because of its supremacy, guaranteed by Article 4 of the Constitution, there are no public controversies and political polarities. Decentralization is mainly limited to the administrative sector, and participation is confined to the "civil political society, i.e., mass organizations representing different groups and interests of the society" [33]. However, both the administrative system and the civil political society are guided and controlled by omnipresent party structures on all levels and in all sectors, which guarantees that party decisions and priorities are followed.

Despite important general conceptual and empirical contributions to analyze and close the gap between policy formulation and implementation [34,35] and to lower barriers to environmental policy integration [25] many questions remain unanswered concerning the management of natural resources in a one-party state. For example, it is not clear why regional and local institutions fail to be effective regarding environmental policy integration despite significant institutional development and control [36], and why environmental policy failure and environmental policy-implementation gaps continue to exist [26].

This can be exemplified in the case of mining construction aggregates in Vietnam. Although the central government has decentralized licensing procedures to the provincial level, the implementation of the environmental legislation has not yet been successful enough to avoid negative repercussions of extraction activities, such as negative landscape impacts and related ecological consequences, which are evident all over the country. One reason for this may be attributed to the economic growth primacy of the country, which may lead to limitations for environmental policy implementation and integration and the respective planning system. It may also restrict critical public debate and participation and engagement regarding environmental issues, i.e., factors, and these seems to be among the key institutional barriers for achieving a comprehensive implementation of environmental policies and the integration of environmental considerations into other sectors [37–39].

Against this background and based on the analysis of the literature on environmental policy development and implementation in Vietnam and China, six hypotheses about institutional barriers for the implementation and integration of environmental policies in fast growing economies with a one-party regime have been identified (Figure 1).

- Prevalence of top-down approaches with insufficient trigger-down effects [4,8,40]: Important policy decisions are made by the ruling party in a top-down manner. Although they are often based on horizontal and vertical feed-back information loops, and even if they are translated into targets, they are not always operationalized in a clear and stringent way, thus giving leeway for interpretation and implementation in different sectors and at lower levels of government. On the one hand, this favors flexibility; for example, in cases where regional and local realities may require deviation from the official line of a policy. On the other hand, this may result in predisposed obedience by ambitious implementers who, due to prevailing compliance mechanisms and incentives, try to (over-) fulfill the set targets at any cost, even if the implementation of policies may lead locally to negative repercussions and counter-productive effects.

- Predominance of socioeconomic over environmental objectives [8,10,38,41–44]. In fast growing one-party systems, economic success seems to be vital for political stability, and vice versa. Thus, economic growth and modernization policies prevail whereas environmental objectives endangering or limiting growth and socio-economic development are seen as secondary. Thus, successful efforts to harmonize socioeconomic and environmental objectives on equal terms are scarce. This may negatively affect the coherence between them.
- Weak incentives to improve environmental performance [10,38,45]: In a system where economic growth is dominating the political agenda and where this priority is expressed in Five-Year-Plans with targets related to annual production, it is unlikely that environmental concerns that may have the potential to endanger economic success and social objectives are openly expressed. For example, the probability is low that in economic sectors that are oriented towards maximizing the use of resources and pursuing social goals, such as the promotion of small scale operations, strong incentives to improve environmental performance are established. This is especially relevant when environmental regulations are perceived as counterproductive to the realization of the national, regional, and local production outputs.
- Fragmented environmental planning and implementation [4,10,38,44,46,47]: Fragmented environmental planning and implementation is a weakness in almost all politico-administrative systems. This may be aggravated when unconditional economic growth is seen as vital for national stability, and environmental issues are treated as negative side effects of growth policies that can be dealt with at a later stage. Thus, environmental responsibilities are not dealt with in a comprehensive way but are split administratively. This may considerably weaken the influence of institutions in charge of environmental affairs at the different levels of government.
- Weak institutional control mechanisms at lower levels of government [8,47,48]: In a one-party state, one may expect strong institutional structures for the implementation of policies at all levels of governments. However, as many examples worldwide have demonstrated, the availability of capacities, knowledge, technology, and tools, especially at the lower levels of government, is a severe challenge. Lower level institutions are often understaffed, and there is a structural shortage of well-educated and trained personnel. Lacking technologies and equipment as well as difficult infrastructural conditions make efficient control of operations outside of the main urban centers time-consuming and barely possible. Moreover, if officers detect violations of environmental rules they cannot be sure that they have already been sanctioned by higher ranking authorities, e.g., for strategic reasons.
- Compliance oriented public participation and deficient compensation mechanisms [4,38]: Usually, public participation is expected to help raising the acceptance of policies, contributing to their smoother and more effective implementation. Although the initial costs in terms of efforts and time may be rather high, it is expected that public participation, e.g., through the involvement of communities, media, and local non-governmental organizations (NGOs), in policy development and implementation is highly beneficial. Controversial interests can be balanced, and the implementation of negotiated solutions can become more solid. However, in a system where interests are mainly expressed by party-controlled mass organizations, participation may become more compliance oriented and affirmative, and controversial concerns and implementation impediments may be blanked out. This makes the implementation and integration of environmental concerns as well as compensation mechanisms in sector policies more unlikely and difficult.

In the following, the relevance of this "taxonomy" for the incorporation of environmental concerns in the construction aggregate mining sector in Vietnam is discussed.

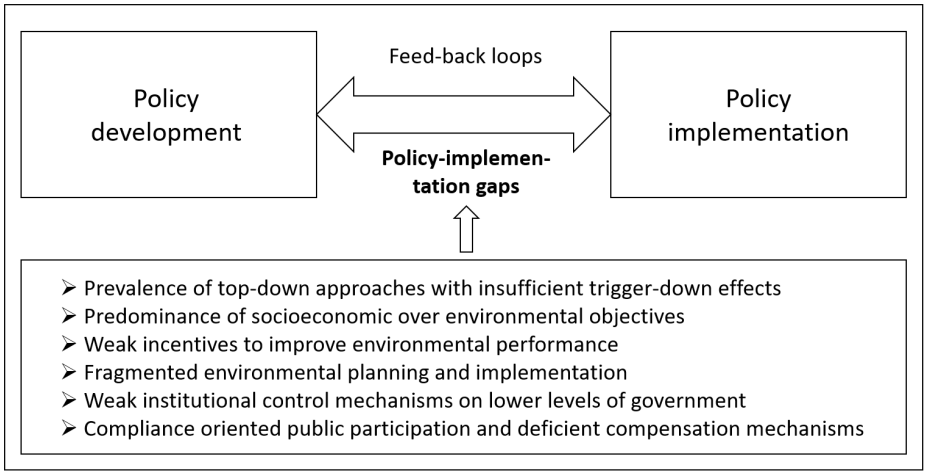


**Figure 1.** Barriers for policy integration in a one-party state, compiled by the authors.

## 3. Materials and Methods

The main question of this article is whether and to what extent the recognizable environmental policy integration deficits and implementation gaps in the aggregate mining sector in Vietnam can be explained by the above mentioned taxonomy of implementation barriers. The study was carried out during the running time of a joint German-Vietnamese project between 2015 and 2019 (see the funding information at the end of this paper) but covers a wider time frame. In the study, a mixed-methods approach was applied.

First, an analysis of the legal documents, planning documents, and scientific literature was conducted. Regarding the legal situation, a recent study by Albrecht et al. (2019) [13] was referred to, which provides detailed information about the legal stipulations as well as their relevance and impact. Here, the analysis is limited to the framework conditions that can be understood as starting points for the analysis of the identified features of environmental policy integration and policy-implementation gaps. Second, statistical data were analyzed using descriptive statistics. Third, in-depth semi-structured interviews with relevant public and private stakeholders as well as group discussions for information gathering and validation of results were conducted. Fourth, quarry site visits were conducted.

Based on the 2013 Constitution of the Socialist Republic of Vietnam [12], the first step of the analysis was to identify the legal framework for developing and implementing environmental policies with regard to mining of construction aggregates, such as the procedures for granting mining licenses, for extracting and processing minerals, and for the closure of mines (Table 1). Respective laws and bylaws, i.e., decrees, circulars, and resolutions, were collected. As Vietnam is a one-party state, one has to take into consideration here that laws make reference, but cannot conflict, to the party's policies and guidelines. Circulars, decisions, and resolutions, developed by different authorities, are crucial as they provide relevant implementation details [13].

The legal framework analysis allowed identification of the institutional stakeholders involved in aggregate extraction procedures (Table 2). Due to the complexity of the legal system, snowballing was used to identify and reach relevant stakeholders. Vietnamese research partners and provincial authorities contributed to identifying non-governmental actors from the private sector and the "civil political society" [33], which were engaged with environmental aspects of aggregate mining in Vietnam. Here, one has to note the following peculiarities: Mass organizations are usually party sponsored and controlled. They have strong grassroot links and large memberships. Business organizations and NGOs can be informal or associated with official organizations. They are generally accepted as counterparts of a local authority [33].

Furthermore, a semi-structured interview protocol was developed in order to identify shortcomings in environmental policy integration and implementation. The above described taxonomy was used as a reference to conduct interviews and to test whether the mentioned institutional barriers are affecting the

implementation of the environmental regulations addressing the extraction of aggregates. Interview outlines were sent in the Vietnamese language long before interviews took place. Additionally, members of the government were contacted in advance in order to obtain official permission to get access to informants and to allow the visiting of quarries. Here, it is noteworthy to understand that almost all interviews had to be organized through Vietnamese research partner institutions and the provincial government, i.e., the Department of Natural Resources and Environment (DONRE) in the respective case study province.

With regard to the way to conduct effective interviews in Vietnam, different researchers highlight the importance of building relationships and trust, because this strongly affects the willingness and openness of the participants in interactions with interviewers [49,50]. Following this and other local advice, a first visit was conducted in November 2015 to get to know potential stakeholders. Some stakeholders were invited to become informants via personal relationships "*in the form of helping*" to conduct research, as Nguyen calls it [50]. A total of 37 interviews and several (multiple) site visits were conducted in two rounds (November 2016 and November 2017) at different administrative levels (Table 2). During further visits, results were discussed and validated in moderated group discussions with a broad range of stakeholder groups.

**Table 1.** Legal documents addressing environmental aspects of aggregate mining in Vietnam, compiled by the authors.

| Document | Regulation Aspect |
|---|---|
| **Law on Minerals No. 60/2010/QH12** | |
| Resolution 02-NQ/TW | Strategic orientations for mineral resources to 2020 with a vision to 2030, 2011. |
| Resolution 76/2013/NQ-HDND | Hoa Binh Master Plan for the exploration, exploitation and use of three kinds of minerals for construction. |
| Resolution 103/NQ-CP | Action plan for implementing Resolution 02-NQ/TW, 2011. |
| Decree 158/2016/ND-CP | Detailing the implementation of a number of articles of the Law on Minerals. |
| Decree 164/2016/ND-CP | Environmental protection fees on mineral extraction. |
| Decree 203/2013/ND-CP | Defining the method and charge of the mineral extraction right. |
| Decision 2427/2011/QD-TTg | Strategy for Exploitation of Mineral Resources to 2020 with vision 2030. |
| Decision 45/QD-TTg | Approving the adjustment and supplementation of the planning for minerals for construction until 2020, 2012. |
| Decision 152/2008/QD-TTg | National Master Plan for the Exploration, Exploitation, Processing and use of Minerals for Construction. |
| Circular 04/2012/TT-BXD | Guiding the export of minerals use as building materials. |
| Directive 02/CT-TTg | Enhancing state management of exploration, exploitation, processing, use and export of minerals, 2012. |
| **Law on Environmental Protection No. 55/2014/QH13** | |
| Decree 03/2015/ND-CP | Providing the assessment of environmental damage. |
| Decree 18/2015/ND-CP | Prescribing environmental protection master plans, environmental assessment, environmental impact assessment and environmental protection plan. |
| Decree 19/2015/ND-CP | Detailing the implementation of a number of articles of the Law on Environmental Protection. |
| Decision 18/2013/QD-TTg | Environmental improvement and rehabilitation and payment of environmental improvement and rehabilitation deposits in mineral extraction. |
| Decision 78/2014/QD-TTg | Organization and operation of Vietnam Environment Protection Fund. |
| Circular 27/2015/TT-BTNMT | Strategic environmental assessment, environmental impact assessment and environmental protection plans. |

Note: The numbers and abbreviations of the legal documents refer to the number and year of publication, as well as to further administrative specifications: BXD: Ministry of Construction; BTNMT: Ministry of Natural Resources and Environment; CP: Government; CT: Directive; HDND: People's Council; ND: Decree; NQ: Resolution; TT: Circular; TTg: Prime Minister; TW: Party Central Committee; QD: Decision.

**Table 2.** Stakeholders participating in interviews and site visits, compiled by the authors.

| Group | Stakeholders (Number of Interviews) |
| --- | --- |
| National Institutions (4) | ✓ Ministry of Environment and Natural Resources. Departments of Legislation; Agencies: Environmental Protection (3)<br>✓ Ministry of Finance: Departments: Tax Policy (1) |
| Provincial Institutions (9) | ✓ Vice Chairman of Hoa Binh Province People's Committee (1)<br>✓ Department of Natural Resources and Environment. Divisions: Mineral management, Deposit of Environmental Rehabilitation, Environmental Protection (4)<br>✓ Department of Industry and Trade (1)<br>✓ Department of Construction (1)<br>✓ Department of Finance (1)<br>✓ Department of Taxation (1) |
| Districts/Communes (2) | ✓ Chairman of People's Committee Lương Sơn District (1)<br>✓ Chairman of People's Committee Tan Vinh Commune (1) |
| Party (1) | ✓ Secretary of the Hoa Binh Provincial Communist Party (1) |
| Academia and Research (5) | ✓ Faculty of Environmental Sciences, Vietnam National University—University of Science (3)<br>✓ Hanoi University of Mining and Geology (1)<br>✓ Academy of Social Science (1) |
| Mass Organizations (2) | ✓ Fatherland Front, Hoa Binh Province, Tan Vinh Commune (1)<br>✓ Farmers Association, Hoa Binh Province, Tan Vinh Commune (1) |
| NGOs (3) | ✓ People and Nature Reconciliation (1)<br>✓ Vietnam Mining Coalition (1)<br>✓ Forum of Environmental Journalists (1) |
| Business Organizations (1) | ✓ Association of Stone Producers, Hoa Binh Province (1) |
| Individuals and Companies (10) | ✓ Aggregates' producers (5)<br>✓ Environmental consultancy company (EIA) (1)<br>✓ Families affected by aggregates extraction (3)<br>✓ Eco tourism company (Tan Vinh Commune) (1) |
| Quarry representatives (site visits) (7) | ✓ Trung Son (Trung Son commune) (1)<br>✓ Quang Long ( Hoa Son commune) (1)<br>✓ Hop Tien (Cao Duong commune) (1)<br>✓ Thai Thinh (Tan Vinh commune) (1)<br>✓ Lương Son - Tan Vinh mine (Tan Vihn) (1)<br>✓ Ha Son (Hoa Son commune). Abandoned quarry (1)<br>✓ Flosvina (Tan Vinh commune). Abandoned quarry (1) |

Note: () indicates the umber of conducted interviews and site visits.

Although government officials did not interfere or stay during the interviews, the necessity to rely on official support to contact stakeholders in the aggregates sector reflects not only cultural aspects of behavior in the society but also the strong authoritarian, i.e., top-down influence, in the Vietnamese politico-administrative system. Interviews were conducted in Hanoi, where ministries and national government authorities are located, and in Hoa Binh Province, neighboring the capital on its southwest border (Figure 2).

The Province of Hoa Binh was chosen as a case study region as it is, on the one hand, one of the most important provinces of the Hanoi Capital Region for the production of construction aggregates, and, on the other hand, it is characterized by a spectacular karst landscape, typical of this part of northern Vietnam, shaped by sedimentary rock outcrops that consist primarily of calcium carbonate formed millions of years ago. These areas, which are rich in biodiversity, are threatened by mining as many outcrops are being quarried for limestone and dolomite [51,52]. In 2017, fifty quarries were operating in the Hoa Binh Province, most of them in one district, Luong Son (56%). Besides its natural

conditions, i.e., limestone and dolomite resources, the district of Luong Son is the north-west gateway of the province, located only 40 km away from Hanoi (Figure 3), one of the most important markets for the aggregate industry in the country. Five active quarries and two abandoned ones were visited during fieldwork activities (Table 2).


**Figure 2.** Study area, elaborated by the authors.

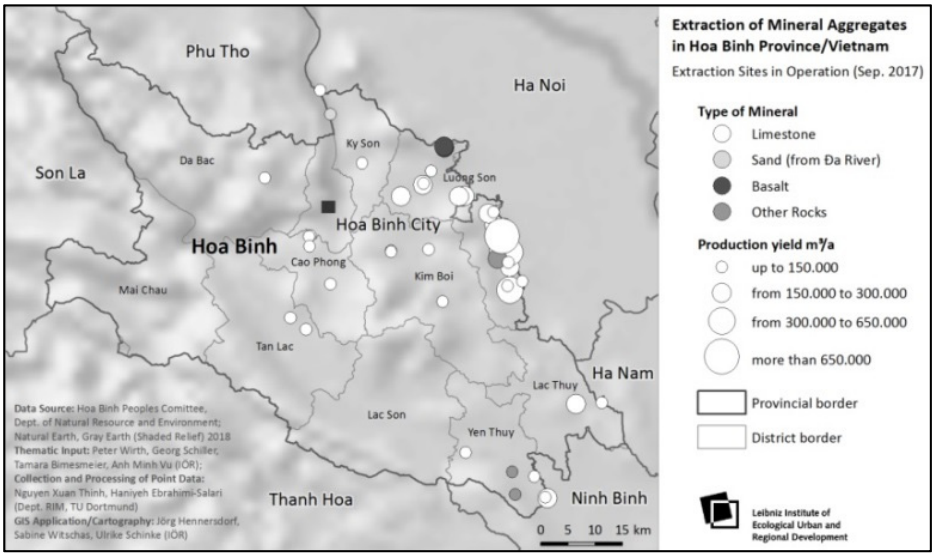


**Figure 3.** Aggregate extraction sites in Hoa Binh Province (2017), elaborated by the authors.

The information gained from the analysis of documents, from interviews, and from site visits was processed and interpreted, applying methods of triangulation. Several workshops and conferences were held in order to discuss the preliminary and final results of the study, and intensive group discussions with the Vietnamese research partners and selected practitioners were used to contribute to the validation of results.

## 4. Framework: Environmental Requirements for the Extraction of Construction Aggregates

Policy formulation in Vietnam is strongly guided by the National Socio-Economic Development Strategy (SEDS, 2011–2020), which is mainly aimed at accelerating industrialization and modernization in order to build the foundations for the country to become an industrialized nation. The SEDS is implemented through five-year Socio-Economic Development Plans (SEDPs). The current SEDP

(2016–2020) acknowledges 10 key objectives, including one targeting the management of natural resources and the protection of the environment. This consideration of the environmental dimension is not new. During the past few decades, the government has undertaken many efforts to develop laws and institutions to promote a responsible management of natural resources [4,8,36]

The decision to decentralize licensing to provincial authorities in 2005 [53] was seen as a national milestone for undertaking actions promoting the sustainable management of resources [3]. However, some years later, in 2012, the Vietnamese government recognized that, in spite of devolution, the exploitation of mineral resources was experiencing serious difficulties, such as violations of labor safety and environmental protection, the continuing use of old technologies for extraction, and the existence of illegal activities [54]. In the case of aggregate mining, decentralization triggered a boom of accepted projects as mining came to be seen as an important source of provincial revenue and a platform to fulfil provincial socioeconomic goals.

Over only 4 years (2005–2008), in Vietnam, nearly 3900 mining licenses were granted by provinces [55]. This is an impressive figure when compared to the 928 projects licensed by national authorities (MONRE) over 12 years (1996 to 2008). In order to tackle the related "*mining chaos*", the government halted mining licensing by publishing a new amendment to the Mineral Law [53], a strategic orientation for mineral exploitation [56] and a decree on environmental protection charges for mining activities [57], which was later replaced by [58] and [59]. These documents were supposed to streamline the licensing process, imposing stronger administrative, financial, and environmental conditions to obtain a mining permission.

Article 9 of the last mineral law requires the government to prepare a 20-year mineral strategy. The document, with a vision towards 2030, stipulates that, as non-renewable resources, minerals must be managed, protected, exploited, and used rationally, economically, and efficiently to meet the requirements of industrialization and modernization [60]. Additionally, the strategy defines specific paths regarding mineral management and planning, science and technology, and finance and environmental protection.

In the case of aggregates, the National Mining Strategy associates their extraction with labor safety as well as with landscape and environment protection. Specifically, the document highlights, in Article 4, the importance of not exploiting limestone on the mountains along national highways in order to protect the landscape [60]. Unfortunately, the official document to address these issues, the Master Plan for Minerals for Construction [61] is rather old. A document published in 2012 [62] only adjusted in a general way the expected production for each type of minerals.

It is important to emphasize that the Law on Minerals [63] states in its Article 5 that the government shall allocate part of the revenues from mining in supporting socioeconomic development in localities where minerals are exploited. Unfortunately, the article was not immediately implemented as the national government "*has not assigned any ministries or relevant offices to develop guidelines for those regulations*" [64]. Nevertheless, since 2017, the environmental protection fee has to be paid to the budget of localities where the mineral extraction takes place [59]. The fee is decided by the provincial authorities and, in the case of aggregates, it has a maximum of 5.000 VND (0.19 €) per cubic meter, depending on the type of construction aggregate.

The Provincial People's Committees (PPCs) are still responsible for issuing mining licenses. However, within the one-party system, the first "approval" of any mining activity is granted by the provincial secretary of the communist party, responsible for setting priorities for socio-economic development. Without the party's "informal" approval, it is not possible to start a mining application procedure.

The formal process includes three main requirements: (1) to present an investment project in conformity with minerals master planning, containing a description of personnel and mining methods, (2) to certify the company's capital equity (at least 30% of investment), and (3) to present an environmental protection plan (EPP) or an environmental impact assessment (EIA), depending on the size of the investment project. Additionally, the application dossier for mining must include a business registration certificate, a map of the mining area, and a decision approving the mineral deposit [65].

Before starting extraction activities, companies face a financial burden as they have to initially pay between 1–5% of the original mineral value to get their mining rights [66]. In accordance with the Law on Environmental Protection (Article 38), mining companies should cover "partially" the costs for building, upgrading, and maintaining infrastructure; carry out repairs in case of loss or damage; protect and restore the environment (plan of environmental rehabilitation); prioritize local employment; and coordinate with local administrations in assuring jobs for local displaced people [67,68].

After completing rehabilitation activities, exploiters shall send dossiers (including community consultation) requesting certification of the completion of activities to MONRE or DONRE (Ministry or Department of Natural Resources and Environment). At the end of the mining cycle, and in case rehabilitation activities are not appropriate, competent agencies shall decide about the use of the deposits for environmental restoration, selecting the specific areas to restore the environment in accordance to law [69].

Provincial DONREs are responsible for facilitating and enforcing environmental regulations in aggregate mining. Specifically, they are in charge of implementing Environmental Impact Assessments (EIAs), conducting environmental inspections, and defining a management plan for resources collected through deposits for environmental rehabilitation. A licensed company deposits a sum of money for a certain period of time in the Local Environmental Protection Fund in order to financially secure post mining restoration [70]. The Vietnamese government incorporates the EIA as an important management tool for approving aggregate projects in case the extraction reaches at least 50.000 $m^3$/year. The major report contents and the reviewing and appraisal processes are clearly described in the legislation [71,72].

Finally, regarding public participation, the Constitution of Vietnam, in its Article 6, mentions that people exercise the State power under the forms of direct democracy and of representative democracy through the National Assembly, the People's Councils, and other State Agencies [12]. Additionally, owners or consultancy organizations shall themselves conduct EIAs. As part of the process, they shall consult the Peoples' Committees of project-covered communes and project affected organizations and communities to minimize the projects' impacts [71,72].

## 5. Results: Obstacles for the Implementation of Environmental Regulations in Aggregate Mining in Vietnam

Although the national government of Vietnam has made significant efforts on institutionalizing environmental protection, compensation, and rehabilitation, the aggregate mining industry is still seriously impacting the Vietnamese landscape and environment [72–74]. Taking the province of Hoa Binh as a living laboratory (Figures 2 and 3), the authors analyzed obstacles for the implementation of environmental regulations in aggregate mining in Vietnam, using the taxonomy developed in Section 2 of this article.

### *5.1. Prevalence of Top-Down Approaches with Insufficient Trigger-Down Effects*

Despite the fact that Vietnam's economy is oriented towards market forces, decisions about production targets continue to be made in a rather top-down manner, where the demand for natural resources and respective market signals play a minor role. Thus, there is a certain disconnection between socioeconomic planning and real world developments, which may limit the role of guiding policy instruments for practice [5].

For instance, in the Hoa Binh Socioeconomic Plan [75], the province declares the necessity to strive for a fast economic development to reach a country average development level and fulfill the development expectations of the national government. Even though the province counts with a Master Plan for the exploration, exploitation, and use of minerals for construction [76], the document neither contains specific guiding principles and objectives, nor information about where the exploitation of sand, stone, and clay would be allowed and where not. The plan provides mainly quantitative targets to be achieved by 2020, reflecting the national production targets broken down to the provincial

level. Against this background, the excavation area of stone and sand in the province was expected to increase by 178% and 206%, respectively, between 2013 and 2019. However, these projections are very distant from the 2017 real figures (Table 3).

**Table 3.** Actual and planned figures for aggregates exploitation in Hoa Binh Province, compiled by the authors.

| Districts | Excavation Area (in hectares) | | | Maximum Annual Production (in tons) | |
|---|---|---|---|---|---|
| | In Use 2013 (1) | In Use 2017 (2) | Planned 2019 (1) | Actual 2017 (2) | Planned 2019 (1) |
| Stone (including basalt and limestone) | 1363.5 | 3092.9 | 3785.21 | 15,687,700 | 29,890,728 |
| Cao Phong | 14.8 | 8.1 | 68.80 | 325,331 | 652,750 |
| Da Bac | 3.0 | 1.0 | 91.90 | 52,220 | 208,880 |
| Kim Boi | 14.0 | 14.0 | 221.91 | 441,259 | 744,135 |
| Ky Son | 91.3 | 6.5 | 257.70 | 73,108 | 2,611,000 |
| Lạc Thuy | 164.8 | 20.0 | 486.24 | 548,310 | 1,370,775 |
| Luong Sơn | 965.8 | 3007.4 | 2155.23 | 13,517,818 | 22,096,893 |
| Tan Lạc | 22.4 | 6.2 | 55.00 | 177,548 | 391,650 |
| Yen Thuy | 51.2 | 26.0 | 214.15 | 786,052 | 822,465 |
| Hoa Binh City | 20.6 | 3.7 | 27.50 | 91,385 | 339,430 |
| Mai Chau | 7.3 | 0 | 87.00 | 0 | 261,100 |
| Lac Son | 8.0 | 0 | 92.78 | 0 | 391,650 |
| Sand | 95.0 | 20.0 | 290.30 | 51,894 | 921,150 |
| Ky Son | 95.0 | 20.0 | 273.00 | 51,894 | 881,100 |
| Lạc Thuy | 0 | 0 | 17.30 | 0 | 40,050 |

Sources: (1) Hoa Binh Master plan for exploring, exploiting and using three kinds of minerals for building material 2014–2019 with a vision toward 2024 [73], (2) Register of Mining Business, Hoa Binh Province, Vietnam, 2017.

Moreover, local governments and local party bodies at the district and commune levels remain weak and conflicted. In line with O'Rourke's observations, they are rarely proactive, seldom technically competent, and are rather disconnected from provincial debates and decisions [44]. In the interviews carried out during the study, district and communal authorities in the Province of Hoa Binh expressed that they are bound to meeting the national economic targets without having effective possibilities to influence decision-making at the provincial or national levels. Some of them argue that mining activities bring "more harm than good" to their localities, and that they would prefer the development of agricultural and touristic activities in their territories. But due to the existing decision-making set-up, their voices would hardly be heard.

### *5.2. Predominance of Socioeconomic over Environmental Objectives*

The objective of the Hoa Binh Socioeconomic Plan [75] is to strive for fast and economic development through specific sectoral orientations, e.g., in agriculture, forestry and fisheries, industry and construction, and social services and infrastructure (Figure 4). According to the plan, Subarea 1 is geared towards becoming the provincial hub of socioeconomic development, with an investment focus on urban and industrial development, services, and trade. However, neither aggregate mining nor the exceptional tourist potential of the Karst landscape are mentioned even though the area is, on the one hand, one of the largest spots of aggregate mining in the Hanoi Capital Region, and, on the other hand, already like its neighboring province, Ninh Binh, today, a potential hot spot for landscape oriented

tourism. This would require finding a viable balance between the contradictory land-uses and a step concept to turn mining areas into tourist hot spots during mining operations and after mining has ended. However, as this topic is blanked out, neither in planning nor in practice, are new ways of harmonizing mining and landscape development looked for.

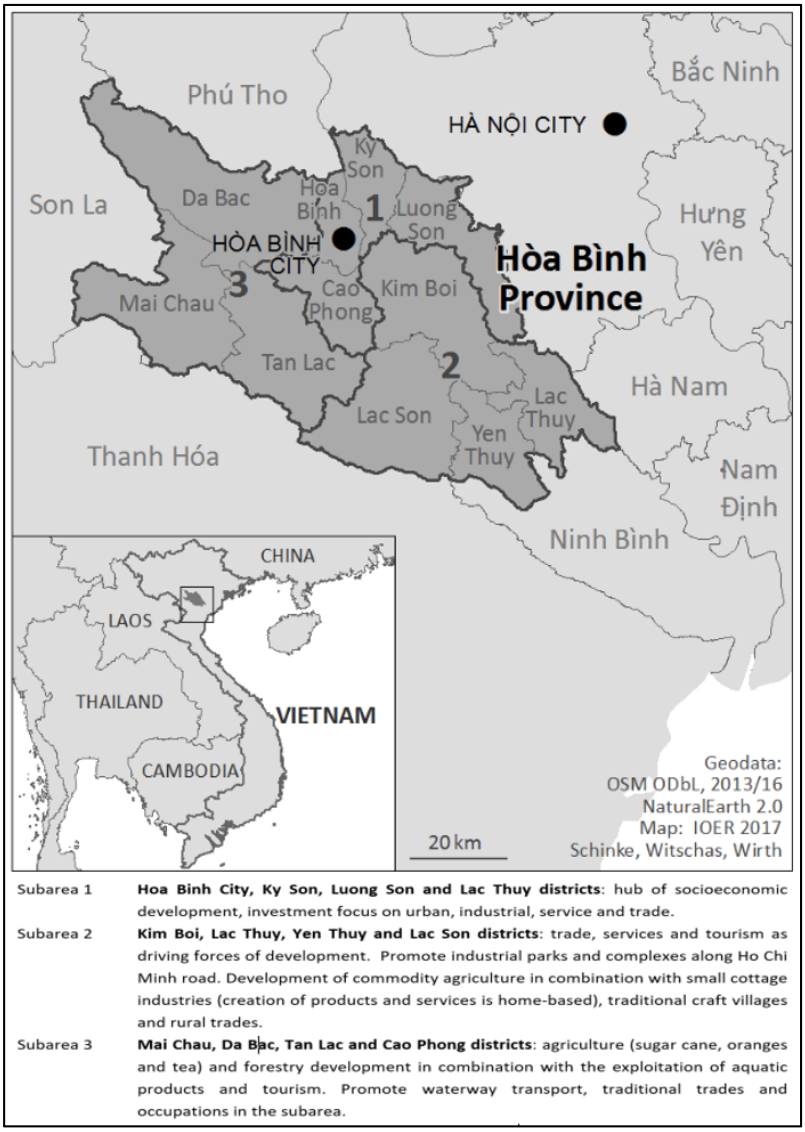


**Figure 4.** Socioeconomic Plan of Hoa Binh Province, elaborated by the authors, based on [75].

Other inconsistencies between socioeconomic and environmental objectives are related to the Master Plan for the exploration, exploitation, and use of minerals for construction [76]. Although it is stated that the maximum annual output per mining license should not exceed 260,000 tons per year, 20 out of 50 operations (40%) go beyond this figure because of economic reasons and market demand (Table 4). Here, one has to bear in mind that, as long as companies fulfill all the administrative requirements and formalities established by the respective regulations, there are no impediments for granting mining licenses. Furthermore, even though strict regulations support environmental protection and labor safety at mining sites, they only seem to play a minor role at the moment of issuing a license and during the operation of a quarry, according to the results of interviews with related stakeholders (Table 2). Mining applications have never been rejected because of environmental concerns, and even afterwards no quarry has been seriously fined or closed because of environmental

violations. If there were licensing delays, they occurred because of the lack of financial capacities of companies to pay the requested taxes and fees.

**Table 4.** Structure of mining companies in Hoa Binh Province according to their annual output, 2017, based on Register of Mining Business, Hoa Binh Province.

| Annual Output (tons/year) | Number of Companies in Absolute Figures and (%) |
|---|---|
| 20,000–40,000 | 3 (6) |
| 40,000–100,000 | 9 (18) |
| 100,000–260,000 | 18 (36) |
| 260,000–500,000 | 7 (14) |
| 500,000–1,000,000 | 13 (26) |
| Total | 50 (100) |

Nevertheless, site visits proved that there are many negative environmental repercussions of mining in the province. There are two main reasons for this. On the one hand, the Master Plan for the exploration, exploitation, and use of minerals for construction [76] explicitly promotes small-scale operations. Thus, only 10 companies (20%) in the province operate in an area that is larger than 15 hectares (Table 5). However, the small size of mining operations and their limited technical and financial capacities hamper the introduction of adequate environmental protection measures, as well as adequate infrastructure and mining techniques; i.e., the introduction of berms and ramps. Cooperation models with the aim of sharing technical means and knowledge between the small-scale enterprises neither exist, nor have they ever been discussed. On the other hand, there are huge discrepancies between the approved, environmentally and technically rather sound plans and the reality of mining operations. Here, again, the small size of enterprises does not make it feasible to implement the planned design measures [74]. Moreover, deviations from the approved licenses are neither registered nor fined by the provincial authorities.

**Table 5.** Structure of mining companies in Hoa Binh Province according to their excavation area, 2017, based on Register of Mining Business, Hoa Binh Province.

| Excavation Area (hectares) | Number of Companies in Absolute Figures and (%) |
|---|---|
| <2 | 5 (10) |
| 2–5 | 14 (28) |
| 6–15 | 20 (40) |
| >15 | 10 (20) |
| No information | 1 (2) |
| Total | 50 (100) |

Despite the evident negative impacts of mining with regard to the environment, agriculture, tourism, and even labor safety, provincial authorities privilege the "potential" role of small-and medium-scale mining in employment creation. Though DONRE is empowered to revoke mining licenses and environmental certificates, this has never happened. During 2017, due to the introduction of new financial regulations regarding mineral extraction rights, some small companies stopped operations. However, this did not happen because of environmental violations but for financial reasons. As a reaction to company complaints, the Provincial People's Committee decided to reduce the respective new fee by 30 percent in order to encourage further investment and to accomplish national development expectations.

### *5.3. Weak Incentives to Improve Environmental Performance*

In many societies, incentives, i.e., promotion, increase of wages, or bonus payments, play a central role in motivating local governments and individuals to fulfil specific targets. Reversely, in cases of failure to meet binding targets, institutions and individuals can be held accountable and punished through the denial of promotion or formal censure [38]. In a one-party state, these mechanisms are usually even stronger because of the role of the ruling party.

In Vietnam, the predominance of socioeconomic over environmental objectives thus may contribute to explaining the results from interviews regarding the reasons for the poor environmental performance of quarries in Hoa Binh Province. On the side of enterprises, better environmental performance (and labor security) would raise production costs and reduce competitiveness. Moreover, as regards individual initiatives, companies have so far widely resisted the introduction of technological improvements due to perceived risks linked to constant changes in environmental and tax regulations. For instance, in 2017, some small companies stopped operations because of a considerable rise of fees for mining rights. This is exacerbated by the large number of very small producers with a limited capacity for upgrading their production.

These factors work hand in hand with structural deficits and specific mechanisms on the side of the government:

First, there are no official state initiatives, tax incentives, or other support programs for the aggregate industry that would help to change the poor environmental behavior of companies. Whereas the government encourages cities and towns through economic incentives to move up in the urban class hierarchy [5], or, as a reaction to fiscal decentralization, many provinces provide generous tax incentives to attract international investors, no such economic, administrative, or reputational measures are in place regarding the aggregate mining sector to reduce its environmental footprint.

Second, due to the absence of an environment oriented guidance with regard to aggregate mining, regional and local level officials seem to have little willingness to thoroughly address discrepancies and conflicts between the strategic role of aggregate mining in the province, and its negative repercussions for the environment.

Third, due to the weak incentives, as well as scarce technical and financial capacities, there is little effort by the government to control and improve the environmental performance of enterprises in the aggregate mining sector. Another aspect to be considered here is that aggregate extraction is dominated by some individuals who have close links with the political leadership and middle bureaucrats in charge of environmental monitoring.

Moreover, mining communes do not always profit from revenues in the same way they contribute to them. For example, from the total construction aggregates related environmental tax, collected in 2016 in the Hoa Binh Province, the "mining district" of Luong Son, which mainly contributed to the revenues, received only 13%. Revenues were invested mainly in road projects that benefitted three "non-mining" communes. Thus, discrepancies between the regional distribution of revenues from aggregate mining on the one hand, and the allocation of projects financed by them on the other hand, seems to be another major concern.

All in all, this results in the reluctance of companies to strive for better environmental outcomes in the aggregate mining sector. Their position is strengthened through weak control mechanisms on the side of the provincial authorities. Moreover, there are no environmental non-governmental organizations or organized initiatives that would criticize this situation and fight for environmental protection and respective improvements. Communes feel unfairly treated, and become rather passive.

### *5.4. Fragmented Environmental Planning and Implementation*

Whereas, in Vietnam, policy formulation is centralized, policy implementation has at least partly been decentralized at the province level. This is especially true for the construction aggregates sector. What may be seen as a first positive step towards more regionally based action has proven to be a bottleneck for a comprehensive, environmentally sound, and sustainable development, at least as

regards mining construction aggregates. This is mainly due to two factors, i.e., the distribution of responsibilities at the provincial level, and the limited implementation and environmental management capacities of the lower level administration.

Even though, already in 2001, the government clarified the responsibilities and budget requirements to increase the influence of provincial environmental units over natural resource planning and management, positive impacts have been minimal [77]. Nowadays, there is a fundamental lack of environmental integration at planning and program levels, especially in plans for urban development, land use, and mining. Concerning aggregates extraction, the Provincial People's Committee is the body in charge of planning the use of natural resources and licensing mining operations. At the executive level, responsibilities regarding the use of natural resources and the environment are fragmented. DONRE and the Department of Industry and Trade (DOIT) are both responsible for preparing the decisions of the Committee and monitoring the extraction activities of private companies. As both are driven by a strong output orientation, the institutional awareness of the negative environmental impacts of aggregate mining is weak. There are also hardly any public mechanisms in place to hold government authorities accountable for their performance. Thus, environmental concerns are institutionally underrepresented and difficult to enforce.

Moreover, as in many countries of the global south, in Vietnam, provincial, district, and commune capacities are scarce, especially as regards environmental management. Authorities are understaffed and merely equipped to fulfill their functions. This makes it time-consuming and extremely difficult to enforce control mechanisms regarding mining operations. Thus, it is not surprising that even engaged environmental and natural resource officers do not have a full picture about the mining situation, eventual violations, and negative environmental repercussions in the province. According to fieldwork observations, the violation of formal blasting procedures and required labor safety measures are rather common. However, documented evidence is rare, and it is almost impossible for the few responsible officials in charge to keep track and act against violations. During site visits, it was also found that, on certain occasions, it was also difficult to identify abandoned mining sites.

Against this background, it is interesting to note that a third department on the provincial level is involved in paving the way for the counterproductive environmental effects of mining. The Department of Taxation is responsible for defining the environmental protection fee. However, the fee is calculated on the basis of the mineral output without taking the environmental impacts caused by each mine into account. Thus, for example, there are hardly any negative sanctions for environmental damages, i.e., when inappropriate extraction methods produce cascading environmental effects initiated by the removal of rock, which alters the natural system and lowers the water table.

Summarizing, there are unclear environmental linkages between concerned agencies, and the allocation of responsibilities is poorly defined. Besides, better coordination and effective integration of the territorial, environmental, financial, and legal criteria for authorizing aggregate mining is missing.

### *5.5. Weak Institutional Control Mechanisms*

Two implementation agencies, DONRE and DOIT, are officially responsible for the management of construction aggregates at the provincial level in Vietnam, and in particular for the implementation of the Law on Environment Protection. As interviews and site visits have demonstrated, the effectiveness of the system is challenged by the very small staff capacity and resources available to carry out site visits in order to follow up the wide set of mining regulations and standards.

Furthermore, many quarries are not controlled simply because their exact location and extension are not known, and there is no map available with the location of the extraction sites. Additionally, there is a lack of technical knowledge about what constitutes appropriate mining methods, including proper blasting practices. Interviews conducted among different provincial departments involved in the process (Table 2) show that local officers play a bureaucratic and passive role in granting licenses, limiting their role to collect the required documentation, and taking care that the respective taxes and

fees are paid. In other provinces, there are even reports about inspectors who refuse to leave their offices, and staff members who are "getting rich off of kick-backs" [44].

Concerning the closure of mines, Vietnam shows a comprehensive legal framework on post mining rehabilitation. A rehabilitation project must be enclosed, considered, and approved, together with the environmental impact assessment report. In order to enforce this obligation, mining companies must deposit a certain amount of money prior to mineral exploitation, i.e., restoration deposits.

According to information provided by the provincial Register of Mining Business, two mining sites are currently scheduled for closure, both located in the Luong Son district. However, mining rehabilitation activities have not been implemented, and the individual projects for rehabilitation could not be revealed. Mine closure seems to be still understood by the government and entrepreneurs as the end of mining rather than one step in a process of the environmental recovery of ecosystems and communities [78]. This perception was already identified in 2011 by the transparency initiative in extractive industries promoted by the government [79]. The actual study in Hoa Binh has demonstrated that the related difficulties still exist.

### *5.6. Compliance Oriented Public Participation and Deficient Compensation Mechanisms*

Public participation is usually seen as a suitable instrument to raise awareness and support for policies and their implementation. It may be conducted in different forms and at different levels, respectively. There is a myriad of models, means, and guidelines for successful public participation [80–82]. It may be limited to one-sided, government-to-people information. It may occur at the level of two-sided communication and consultation, where authorities are interested to learn as much as possible from the public about their needs and views, and enter into negotiation processes about priority setting or conflict resolution. It may also allow the general public to take a stake in decision-making, and it may be oriented towards engaging the public in implementation activities.

In authoritarian regimes, such as one-party states, the participation of stakeholders in formulating and implementing policies is a delicate issue, and it may be rather complex and occur formally as well as informally [30,31]. In most cases, public participation focuses on organized interests whereas individuals have limited possibilities to participate on something higher than the mere information level.

With regard to the aggregate mining industry in Vietnam, mass organizations play a crucial role with regard to public participation. According to the legal requirements, the People's Committee of the respective commune(s), as well as organizations of the civil political society, such as the Fatherland Front or the Farmers Association, are consulted during the decision-making processes about aggregate mining. However, following the results of interviews with representatives of these institutions, meetings are often skipped and consultation is done through letter communication. Moreover, the organizations are controlled by the party and, therefore, dissenting opinions are hardly raised. Consequently, participation can be described as a mere "*formalism*" [83], and it is usually affirmative.

Moreover, during the evaluation process regarding compensation measures to mitigate the negative impacts of mining for the environment and the local population, the respective communities are not always addressed thoroughly and comprehensively by higher level authorities. For that reason, it happens frequently that local inhabitants are dissatisfied with the compensation measures, e.g., regarding negative repercussions of mining on their cultivated land. They complain about dust, noise, damaged crops, cracked houses, and dangers for road users, etc. Nevertheless, they have only limited channels to forward their complaints. Aside from persuading enterprises to perform their commitments and mitigate adverse impacts to the community, local authorities, i.e., communes, usually cannot do more than submit complains to higher level authorities, i.e., districts. Thus, it seems that the actual compensation enforcement is mainly left to local private negotiation, e.g., between farmers and enterprises, instead of implementing existing regulations in a satisficing way. In one case, the respective mining company constructed new houses for farmers and paid a certain amount of money in order to get the consent of the farmers to enlarge the quarry.

Regarding compensation for environmental damage, there is also a problem of transparency. Although the fee to obtain a mineral extraction right for aggregates is rather high, the way it is collected and spent afterwards is somehow obscure. Neither the industry nor the population are informed about how and for what purposes the money is spent. As explained above, the environmental protection fee must be used for environmental improvement and recovery in the mining areas. However, according to interviews with entrepreneurs, mining companies are asked to pay additionally for this purpose.

## 6. Discussion and Conclusions

The study has demonstrated that the taxonomy elaborated in this article provides a viable concept for analyzing policy implementation gaps and deficits of environmental policy integration in a fast urbanization one-party state. In the Vietnamese construction aggregate mining sector, the six factors identified above play an important role in explaining policy-implementation gaps and difficulties for environmental policy integration in the resource-based industry, which is highly relevant for urban socio-economic development and the provision of growth related infrastructure. They can also be seen as potential entry points for minimizing negative environmental repercussions of aggregate mining on the local level in the country, i.e., in districts and communes.

In general, the interviews conducted in the framework of this study have demonstrated that decision-makers in Vietnam are well aware of the environmental challenges associated with the extraction of construction aggregates in the rural hinterland of fast growing cities. The fact that the national government halted decentralized mining licensing after the proliferation of granting mining permissions by provinces is an indicator of this. However, approaches to balance the use of the resources and to protect the environment at the same time have neither been operationalized nor triggered down to lower levels of government. Consequently, many authorities see environmental damage as an unavoidable by-product of the extraction and use of natural resources, the consequences of which are only to be mitigated in future.

Moreover, the predominance of socioeconomic over environmental goals in fields of national importance that are relevant for speeding up growth and modernization, and thus contributing to political stability, is omnipresent and cannot be changed easily. This is not only directly relevant for environmental policy integration in cases where production goals are to be fulfilled by lower level entities in line with national planning but also indirectly.

On the one hand, socioeconomic goals provide the ground for granting licenses to micro- and small-scale enterprises. Mining master planning acknowledges indirectly small-scale mining as an essential component of provincial socioeconomic development [84]. As a result, mining operations are predominantly small. They are mainly located in one subarea defined by the Socioeconomic Plan of Hoa Binh Province, close to the aggregates market in Hanoi, but without a clear strategy.

On the other hand, as low technology companies, they neither have the capacity to guarantee environmental soundness and the labor safety of their operations nor the knowledge and ability to implement the rather sophisticated, agreed, and officially binding plans for individual mining operations. Developing cooperation models as well as technical and financial assistance could help to improve the situation and balance the conflicting socio-economic and environmental interests. This also calls for stronger incentives to improve environmental performance, for the mining sector as well as for the respective authorities at the regional and local levels.

Here, the association of stone producers in the province could play a vital role. Founded in 2012 and approved by the Provincial People's Committee, it was formally launched in 2015. It is financed by its 43 members and has the aim of promoting and transferring technological knowledge. This platform could be encouraged to play a more active role in decision-taking, with inputs regarding the market potential of construction aggregates, the allocation of quarries, environmental monitoring, and post mining activities. Additionally, the approximately 2000 quarry workers linked to the association could receive more training regarding mineral extraction and blasting practices through the association,

which are currently conducted by DONRE and DOIT officials who, however, do not coordinate their work and barely have contact with one another.

Regarding the fragmented environmental planning and implementation, a more balanced comprehensive and long-term provincial vision would be helpful. The role of aggregate mining and its environmental challenges should be more actively addressed in the Socioeconomic Plan of the Province. This should lead to legally binding and implementable stipulations in combination with more effective environmental monitoring and control. Additional benefits include the reduction of information asymmetries and increased learning and knowledge spillovers, e.g., regarding technology [84]. The strategic mining investment vision could be further detailed in the provincial master plan for aggregates. In this document, post-mining should be considered as an opportunity for creating interesting and environmentally beneficial landscapes [85], and for creating new ecosystems that meet the expectations of all actors involved.

This would have to go hand in hand with a more effective and consensual allocation of tax revenues and environmental deposits. The central government empowers the provincial level to impose and collect taxes and fees from mining companies and to use "*part*" of them in promoting socioeconomic development. Nevertheless, in practice, the province freely disposes of revenues allocation. Although the tax is not intended to reduce extraction of resources, to enhance their protection, or to encourage recycling as in many European countries [86], it is necessary to detail the role of taxes, and to increase their effectiveness in promoting sustainable management. Tax profits could be used and distributed as part of the package of policy interventions described in the provincial socioeconomic plan.

Moreover, the rehabilitation fund, managed by a local state foundation [67], should be used for mining restoration. DONRE is planning to use the money, collected since 2010, in giving soft loans for programs and projects connected with responses to climate change and environmental protection. Although the idea is to support initiatives that are not included in the provincial budget plan, the recommendation is the same; to focus public and private investment on the environmental dimension of provincial socioeconomic strategies already defined in the master plan.

Finally, the weak and compliance oriented public participation mechanisms have proven to be a bottleneck for policy implementation and environmental policy integration. The Vietnamese one-party top-down politico-administrative system has only slowly incorporated stakeholders traditionally excluded from decision-making processes. Nowadays, certain groups articulating interests and demands, such as aggregate mining enterprises, farmers, women, veterans, youth etc., are officially recognized by the government as relevant interest groups. However, they are widely controlled by the ruling party, which may facilitate monitoring of social interest, but also limit possibilities to effectively articulate conflictive topics. Thus, a more open process of public participation seems to be vital for improving policy implementation and environmental policy integration in the construction aggregate mining sector in Vietnam. One of its features could be to empower local authorities and institutions, such as the District and Commune People's Committees and the Fatherland Front, to play a more active role in the management of construction aggregates. Although they are closer to people and their conflicts than the provincial authorities, communes feel excluded from land use and licensing decisions conducted by the province. Thus, local land use and environmental conflicts are "resolved" between the companies and the affected land owners without institutional support. Implementing the regulation of including local authorities in conflict mediation [87,88] might contribute to informing and sensitizing the affected population.

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