How Indonesia’s fisheries governance can achieve SDG 14? Linking problem and solution based on a root cause analysis approach

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Abstract. As sustainable development goal (SDG) 14 faces a challenge to achieve the target of sustainable fisheries management and governance. This paper’s objective is to assess the obstacle of Indonesia’s fisheries management and governance with regards to enabling factors in sustainable development related to business practitioners. Primary and secondary data were collected using previous literature, FGD, and in-depth interviews. Indeed, we employed root cause analysis to examine the data with the possible impact on SDG 14. The results highlighted that disconnected activity and communication among stakeholders cause unsustainable fisheries management. The practice of business practitioners had not optimized capture fisheries management, including its post-harvest management. Therefore, limited welfare was achieved by the stakeholders involving, including fishermen. The fishing communities had limited knowledge and business capacity. The study suggested a platform design by the national fisheries institutions to support the fisheries business development and other related stakeholders. This study concluded that a national platform could improve fisheries business practitioners’ knowledge and capacity to engage in national planning to achieve SDG 14.

1. Introduction
As sustainable development goal (SDG) 14 faces a challenge to achieve the target of sustainable fisheries management and governance. Future ocean biodiversity is threatened by fisheries exploitation since it presumed that the exploitation goes beyond the ecological limit [1]. Business practitioners’ actions could not meet the expected results from government regulation due to a limited incentive to be ready and prepare for sustainable fisheries management [2, 3]. Indeed, the involvement of multi-stakeholder in the government program is limited due to a trade-off between sustainability and aquaculture [4]. These can be limited engagement by business practitioners and founded a lower of fisheries sustainability achievement. These problems and results are indicated the fisheries governance should find a solution and keep the SDG 14 can be appropriately achieved.

Finding a solution can be started by understanding the cause of the problem that preventing all stakeholders’ to participate in an active role to achieve SDG 14 target [5]. This solution plays an important role in reforming the governance that balances the sustainability framework in the large marine ecosystem context [6-8]. Understanding the problem faced by the fisheries governance will
decide the future of fisheries business that balanced the ocean biological limit with stakeholders’ economics’ motive [8-10]. By understanding the problem, the solution can be found, and it can be expected to encourage business practitioners by using the multi-stakeholder platform to achieve better sustainable fisheries governance [8, 11, 12].

This paper’s objective is twofold, first, to assess the cause of the problem in Indonesia’s fisheries governance with regards to the enabling factors in sustainable development. Second, to find a solution related to the sustainable target that can encourage business practitioners to participate in sustainable fisheries governance.

2. Materials and methods
SDG 14 indicators (Target 14.4: Sustainable fishing) were used to evaluate achievement. Since we were not able to analyze SDG 14 due to data insufficiency, we used qualitative methods as our main approach. The exploratory study provided reasons and insights of the fisheries condition in Indonesia. In this study, we did not perform descriptive analyzing.

An adapted root cause analysis was employed in the study to assess the problem and its solution in Indonesia fisheries management [13-16]. We collected secondary data from previous literature as the foundation to prepare an adapted root cause analysis. Then, we performed a root cause analysis and collected primary data from three focus group discussions. A facilitator guided each focus group discussion to maintain the participants’ focus on the problem to find a solution in the discussion. The focus group discussion participants were 16 academia, eight business practitioners, 11 government officers, and nine community representatives.

There were five steps to assess the objective of this study using a root cause analysis. First, we defined the problem of fisheries sustainable management and marine governance. We observed the symptom that occurred and separated the problems based on its causal relations in the capture fisheries system. The capture fisheries system consists of four main subsystems:
1. The upstream subsystem is the procurement of facilities and distribution of fisheries production facilities, including vessel, fishing gear, bait, fuel and other equipment as the capital of capture fisheries activities.
2. Capture subsystem is the activity of using capital goods and natural resources to produce fish. The actors of this subsystem are producers, namely fishermen.
3. Downstream subsystem (Processing and Marketing) is an economic activity that processes processed products and then distributes them. Some products can be directly distributed to consumers, and some are processed first and then distributed to consumers. Actors in this subsystem are small and large scale industries.
4. The supporting system is the activity of supporting, serving, and providing services for the upstream, capture, and downstream subsystems. The actors of this subsystem are institutions.

Second, we assessed the problems to analyze the related data that linked with the problems for each subsystem in the capture fisheries. For instance, the commercial sector and its players, certain countries with socio-economic, legal, cultural, institutional, and other aspects that influence the problems.

Third, we mapped the causal effect based on "the 5 whys" to interrogate the cause-and-effect relationships underlying a fisheries sustainable management and governance problem [17]. By using this technique, the root cause chart resembled a tree root system that defined many problem directions.

The root system differentiated the main factors that drive the problem with contributing factors. This step was number four from steps that defined the factor based on the systemic, managerial, procedural, funding, awareness, or cultural level of the fisheries sustainable management and governance.

Finally, we discussed the recommendation and its implementation based on an action plan by the multi-stakeholders in Indonesia’s fisheries. After the focus group discussion, we validated the results by in-depth interviews with the multi-stakeholder in fisheries sectors and the government to clarify some issues that were mentioned that linked with SDG 14 targets.
3. Results
The study found that capture fisheries faced an integrated problem from upstream to downstream. The problem was that the practice of Indonesia capture fisheries management is not following a sustainable approach. Consequently, the over-exploitation by fisheries practitioners became a major global issue. The problem led to an unsustainable fisheries management that was practiced by the multi-stakeholders, including the business practitioners. Most of their fishing activity practiced a low fisheries sustainability management from catching to post-harvest management.

Table 1 illustrates the identified problem and its root cause of preventing Indonesia from achieving SDG 14 targets. The identified problem had a causality relationship between fisheries management system with its subsystem, as follows: (1) Capture fisheries were not manage based on optimal utilization (Upstream and Capture Subsystems); (2) The fishermen were not welfare from fishing activity (Capture Subsystem); (3). Post-harvest did not manage optimally (Downstream Subsystem); and (4) Fisheries institutions were inadequate (Support Subsystem).

The findings highlight that the untapped fisheries’ potential in upstream and capture was the subproblem with the most root cause compare to other sub-problems. Whereas, the sub-problem of inadequate fisheries institution had the least root cause. The root cause analysis in all sub-problems shows that there were disconnected activity and communication among stakeholders. For instance, in the untapped fisheries potential in upstream and capture sub-problem, the role of government to monitor the fishing activity had a relation with the ineffectiveness of fishing gear by the fishermen. Thus, the ineffectiveness of fishing gear had a relation with an allegation of overfishing. It may also be related to limited capital access and uncertainty from banking support. A similar relation between root causes existed in each sub-problem.

Table 2 shows the identified solution for each root cause of preventing Indonesia from achieving SDG 14 targets. Therefore, the untapped fisheries’ potential in upstream and capture was the sub-problem with the most solution compare to other sub-problems. Whereas, the sub-problem of inadequate fisheries institutions had the least solution. Most of the solutions lead to an improvement in fishing management and fishing stakeholders.

Among these solutions, we identified a national fisheries platform as the leading solution. This solution was identified to have the main capacity to handle a disconnected activity and communication among stakeholders. This solution will enhance other identified solutions for each root cause to be implemented.

Table 1. Problem identification based on an adapted root cause analysis of Indonesia’s fisheries sustainable management.

| Sub-problem | Indonesia capture fisheries management is not sustainable |
|-------------|---------------------------------------------------------|
| Root Cause  |---------------------------------------------------------|
| 1. Low quality of supervision | 1. High investment costs |
| 2. A low of supervision technology | 2. A low level of fisheries processing management knowledge |
| 3. Lack of monitoring vessel | 3. A low level of fisherman education |
| 4. The fishing gear is not effective to catch fish | 4. Fish pricing is |
| 5. There is an | 1. There is no gender priority |
|             | 2. Lack of knowledge about cold chains |
|             | 3. Policy setting is not based on the bio-economics approach |
|             | 4. No public involvement in |
|             | 1. There is no blueprint on national fisheries development |
|             | 2. There is no independent commission to control fisheries management |
|             | 3. Indonesian politics |
| Problem                                                                 | Indonesia capture fisheries management is not sustainable                                      |
|------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| alleged of overfishing                                                 | under collectors’ monopoly system                                                             |
| 6. The absence of multispecies stock to multi-gear studies             | 5..Difficulties in accessing funding                                                          |
| 7. The absence of sufficient production and data                        | 6. Limited training and assistance are available for fish processors                          |
| 8. A low number of large-scale fleets fishermen                        | 7. A low marketing capacity (cooperative)                                                    |
| 9. Limited capital access                                               | 8. There is no differentiation in fish production                                             |
| 10. Uncertainty from banking support                                   |                                                |
| 11. Difficulties to get fishing permits                                |                                                |
| 12. No legal basis for WPP-based management                            |                                                |
| 13. Overlapping policies between the ministry                           |                                                |

Table 2. Solutions for Indonesia’s fisheries sustainable problem by an adapted root cause analysis.

| Problem | Indonesia capture fisheries management is not sustainable |
|---------|----------------------------------------------------------|
| Sub-problem | Untapped fisheries potential | Business practitioners (fishermen) are not welfare | Post-harvest management is not optimal | Fisheries institutions is inadequate |
| Solution | 1. Develop monitoring technology                          | 1. Support of post-harvest tools investment for fishermen wives | 1. Involved more gender | 1. Develop a blueprint of national fisheries development |
|         | 2. Increase the number of monitoring vessels             | 2. Training in fisheries processing, competitiveness, and branding | 2. Cold chain training and assistance | 2. Established an independent commission on fisheries supervision |
|         | 3. Technical assessment on the fishing gear feasibility  | 3. Soft skills training for fishermen | 3. Established policies based on bio-economics | 3. Facilitates public consultations on marine and fisheries policy |
|         | (environmentally friendly)                               | 4. Market assessment for collectors and fishermen | 4. Public consultation should be conducted before the policy is established | 4. Re-mapping fisheries research |
|         | 4. Incorporated fishing policies with biological and      |                                                |                                                |                                                |
|         | economic approaches                                       |                                                |                                                |                                                |
4. Discussion

The findings show that Indonesia faces many difficulties in achieving the SDG 14 targets. Despite an increasing demand for seafood which drives a higher price, problems such as inadequate conservation caused by illegal fishing, destructive fishing practices, and seafood fraud, has prevented Indonesia to achieve SDG 14 objective. The fishing practice was beyond the biological limit and not considering environmental development [1, 6].

We found a dilemma between the current practice and the sustainability goal. The government planned to increase fisheries contribution from 3-4 percent of GDP in 2018 to be closer to other countries such as Japan, Korea, and China that could reach 30 percent from their GDP. However, the expected economic growth and fishermen welfare were not achieved [2, 3]. The economic potential of multispecies fishing is not appropriately managed since inadequate data related to multispecies in relation to multi-gears fishing. Therefore, single species oriented fishing is the main business objective which is harmful to the sustainability of fish resources. Moreover, the fishing area is still focused on a limited area in the Java Sea, which does not utilize the available fishing area regulated by the Law of the Fisheries Management Area Republic of Indonesia. Thus, fisheries resource potential is not optimized.
We identified the problem in Indonesia fisheries management, and governance is related to capture fisheries systems. The fisheries system is integrated from upstream to downstream with a strong interrelation with each other in chain governance. The interrelation leads to the chain governance that determines the actors’ behavior in the value chain [18, 19]. Furthermore, sustainable fisheries could lead to a complex biosecurity practice to support the market demand in the context of value chain governance [20]. Consequently, in order to solve fisheries management problem, the fisheries sector needs a comprehensive solution that includes the upstream-downstream system, and social, economic, and ecological aspects in their governance. Fisheries management can be developed by using a bio-economic model [10].

In this study, we identified a root cause of the central sustainability problem of Indonesia fisheries management. Most of the problem rooted in the fact that the stakeholders had limited knowledge and business capacity in fishing and processing management. Fisheries actor capacity is not increased and mostly caused by the fishermen’s limited business mindset and fishing capacity. Therefore, most of the captured fishes are losses due to poor post-harvest and processing management. That is a classical source of the problem that holds back the fisheries sector to become sustainable. Since there is no improvement for fishermen’s knowledge and enhance the processing industry, therefore the expected economic growth is not achievable. As a consequence, limited fishermen welfare could be achieved.

The provided solution to the identified root cause leads to the improvement of fisheries and marine governance. In the large marine ecosystem context, the problem needs a new policy from a reform fishing governance that balances the economic goal with a sustainability framework [6-8]. Therefore, the study suggested a platform design by the national fisheries institutions to support the business practitioners and other related stakeholders [8, 11, 12]. The national platform can be set up to enhance planning and implementation in fisheries management and governance. The national platform is a multi-stakeholder partnership led by the government and supported by the university to achieve sustainable business development [21]. Moreover, this national platform can be supported by a smaller platform by the local community such as cluster business in a small region or village to ensure the SDG 14 targets can be achieved [7, 22].

5. Conclusion
This study concluded that a national platform of Indonesia fisheries and maritime is urgently needed. It will lay a foundation for multi-stakeholders’ partnerships in planning, controlling, and mediating the fisheries regulation and practices. The platform could increase involvement from the key actors, and it at the same time could improve business practitioners’ knowledge and capacity to engage in national planning to achieve SDG 14. The role of government and academics is crucial to balance the fisheries economic, social, and ecological sustainability in the platform governance. So, the sustainability of fisheries and marine under the context of SDG 14 targets can be achieved.

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