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# The impact of delimitation and demarcation of interstate borders after the colonial era in Peninsular Malaysia

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**Abstract.** As a result of the colonial administration's use of correspondence, agreements, and gazettes to define interstate borders along the borders of neighbouring states, peninsular Malaysia's interstate borders were organically drawn around rivers and watersheds. Unfortunately, several flaws need to be fixed, including the river's fluctuating path, delays in decision-making, and the state government's ignorance of the significance of demarcation. Due to the significant social, economic, political, and jurisdictional ramifications, the demarcation of the interstate border in peninsular Malaysia has been the focus of intense controversy. The interstate natural boundary, like the river, is linked to damaging common-pool resources in addition to the overconsumption of natural resources. In order to give a thorough understanding of inter-state border demarcation and to implicate useful policy actions, the application of effective factors for inter-state border demarcation revision into six factors should be made based on its impact: constitutive agreement, authoritative mandate, operational structure, technical specifications, dispute resolution mechanisms, and additional components known as sustainable border governance. This review was carried out by carefully examining the supporting data from the extensive border studies literature and questionnaire. The idea of interstate boundary demarcation involves several aspects that show how changing state borders can affect both states' authority, law enforcement, socioeconomic conditions, and tax revenues. In order to help readers better comprehend the significance and impact of interstate border delineation in peninsular Malaysia, this article offered a different perspective on the topic.

## 1. Introduction

Borders are physical boundaries that are imposed by natural features like rivers or by arbitrary associations of political actors like federated nations, governments, and other subnational institutions. Boundary delimitation is the process of drawing boundaries between political entities that live in a region. Borders can also be drawn through conflict, colonization, or simple symbiotic agreements between those political entities. A border is a line that physically or symbolically separates two geographic areas. Borders define political limits. A border defines the area that is under the purview of one governing entity. A region's government is only allowed to adopt and enforce laws within its limits.

Demarcation is the conceptual separation of two objects by a line, boundary, or other means. Geographically, a demarcation could be a river dividing two areas or a boundary separating two nations. Delimitation is the process of identifying a state's general land borders as well as its maritime borders [1]. The act of "delimiting" a border involves physically identifying its location on a map or



by verbally describing it in the text of a law or treaty. On the other hand, demarcation entails assessing the border region and setting up boundary posts on the ground. The additional and distinct process of demarcating a line of demarcation with tangible, visually, and physically perceptible objects is called demarcation. Demarcation is a more specific and thorough process, which distinguishes these two institutions. Contrarily, demarcation involves establishing a boundary line on the ground and defining it with boundary pillars or other similar physical things. Delimitation, however, does not always provide the element of stability and finality that ought to be the fundamental goal of all international boundaries on a boundary line. As a result, in addition to the linguistic definition on paper, it will be necessary to more firmly establish its position on the ground. A boundary is considered to be marked in this manner. Determining a boundary line, therefore, involves establishing it as mutually agreed upon using boundary pillars, monuments, buoys, and other permanent structures along the topographic contours of the regions to be divided by it.

In Malaysia, establishing and finalizing interstate borders is crucial since it represents the institution's longevity and national sovereignty, although progress has been sluggish because of particular problems [2-5]. The Anglo-Dutch Treaty, commonly known as the London Agreement, established the Federated Malay States in 1896, and as stated in the Land Code of 1926 published in the Federated Malay States Government Gazette 1926, it defined the inter-state border in Malaya. The Boundary Convention of June 20, 1891 (signed in London), the Bangkok Treaty of 1899 (Boundary Agreement), the Bangkok Treaty of 1909, the Government Gazettes of the Federation of Malaya, the Memorandum of Understanding (MoU), correspondence between the Secretary of the Resident, the Terms of References (ToR), the adjacent cadastral lots, and the main watershed are all British concepts that are still applied to define interstate boundaries in Malaysia today. Peninsular Malaysia divides the delimitation and demarcation of the interstate border into two (2) categories: artificial boundaries and natural boundaries. The artificial border is denoted by a boundary mark that is remarkably comparable to this boundary delineation technique. According to the border treaty's provisions, natural boundaries including rivers and watersheds would serve as the foundation for interstate borders [6-9].

## **2. Interstate Border Delimitation and Demarcation Overview**

Territorial borders are primarily defined by the delineation of external borders and internal borders within a state, such as administrative borders between local governmental entities, borders between government ministries and agencies, and borders defining real estate properties and rights of use. Natural boundaries included rivers, valleys, mountain ridges, shorelines, swamps, and the edges of deserts. The colonial powers favoured defining natural borders. When separating the British Empire into protectorates in the late 19th and early 20th centuries, the British Colonials used natural borders. Such a divide was simple to put into place, which reduced the amount of fieldwork. International conflicts resulting from ambiguous boundary lines were caused by the system of identifying natural borders over time by using descriptions of notable landscape characteristics [8]. In addition to the obvious drawbacks of using natural borders, border delimitations based on rivers faced additional challenges because rivers are dynamic natural features that alter over time. In a chain of mountains or a valley, the precise geographic delineation required for boundary demarcation is frequently absent [10]. The river has the power to change a stream's course, contribute silt, and destroy its banks. A moving river cannot maintain its course; hence it is difficult to create a fixed borderline that spans it. Rivers that form natural boundaries are far more likely to become unstable than other types of natural barriers [6].

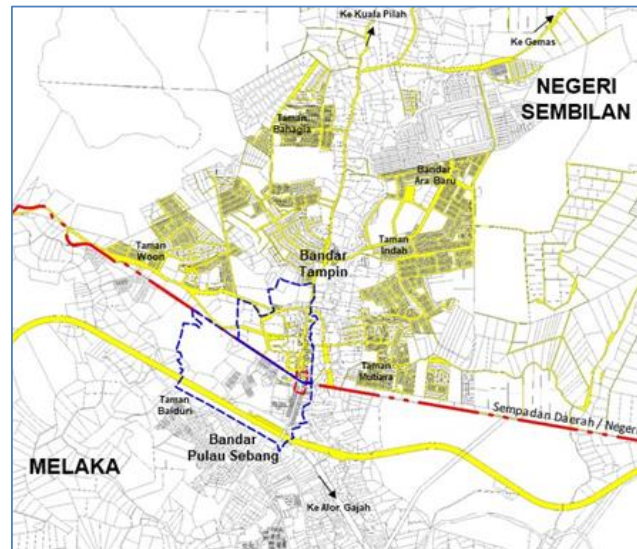
Peninsular Malaysia carries out the boundary allocation, delimitation, demarcation, and recording of the border area in order to establish the interstate natural and maritime border. The Ministry of Land and Cooperative Development directed the Joint Boundary Committee (JBC), which was composed of a number of state and federal government agencies. The Cabinet decided to establish the National Joint Border Committee, State Joint Border Committee, and Joint Technical Committee on March 10, 1993, while deliberating over a Ministry of Land and Cooperative Development memo titled "Delimitation and Demarcation of Inter-State Borders in Peninsular Malaysia." With funding provided by the respective states, this committee was established to coordinate the activities of allocating, designating, and establishing interstate borders [11]. As a result, on January 1, 1994, the

Department of Survey and Mapping Malaysia (DSMM) established the Trust Account Committee with the sole objective of receiving donations from the state governments, which were then used to pay for all costs related to the state-coordinated demarcation work. The inter-state border of Peninsular Malaysia is being held up by a number of causes, including the following: -

- i. It is difficult to say whether the river should serve as the state border as defined in the treaty by the British colonists in the 19th century because the river flow changes direction and does not follow the treaty due to accretion and avulsion [6-9]. This issue is the subject of much debate, yet no solution has ever emerged.
- ii. The state's government does not place a high priority on defining and demarcating its borders with other states [2-5]. Planning and construction of interstate border areas have been delayed down by the remaining hazy boundary boundaries.
- iii. Neither the governance of land boundaries and maritime between states nor the requirement for cooperation among the entities involved in doing so are subject to specified policies [12][13]. Rules must be developed to enable the governance of both state governments because the border area is located above the common pool resource area.

Land boundaries, including natural borders like rivers, must be established before maritime limits can be established. The state's marine boundary committees must examine a list of rights, obligations, and responsibilities before selecting a lead agency for establishing maritime boundaries. Malaysia currently lacks the expertise required to finish the inter-state border demarcation in the JBC, aside from DSMM [14][15]. The JBC has established some practices and implementations for delineating interstate borders in Peninsular Malaysia, although not all of them have reached their full potential and capabilities [16]. The norms, limitations, and duties that will shape the JBC have not yet been taken into account; this case makes it impossible to enforce [17]. In order to effectively manage the determination of interstate borders, restrictions, and enforcement are necessary.

Many cities are found outside of state lines. For example, Tampin - Pulau Sebang located on the Negeri Sembilan-Melaka border, Tanjong Malim-Hulu Bernam Town on the Perak-Selangor border, Bandar Baharu-Parit Buntar-Nibong Tebal on the Kedah-Perak-Pulau Pinang border, Kulim Town-Bukit Mertajam on the Kedah- Pulau Pinang border, and a few more. The governance of the border area is a difficulty in nearly every city along this state's border because the border has not been physically defined. With the exception of Tampin-Pulau Sebang on the border between Negeri Sembilan and Melaka, none of the cities named has formally signed a border agreement through a Memorandum of Understanding between the two neighbouring states. The two municipal governments' issues with overlapping authority and ambiguous boundaries have already been resolved [18]. Examples include a Special Action Plan (PTK) for the Development of Border Cities in Tampin, Negeri Sembilan, and Pulau Sebang, Melaka, as well as a Study of the Planning and Development Coordination Plan for Adjacent Towns under the Administration of Different Local Authorities. These documents were created by PLANMalaysia and local authorities in both states. If state boundaries can be decided upon right away, sustainable urban planning can be put into practice [19]. The concerned cities are shown in Figure 1.



**Figure 1.** Study of the Planning and Development Coordination Plan for Adjacent Towns Under the Administration of Different Local Authorities and Special Action Plan (PTK) for the Development of Border Cities in Tampin, Negeri Sembilan and Pulau Sebang, Melaka.

Source: PLANMalaysia (2020)

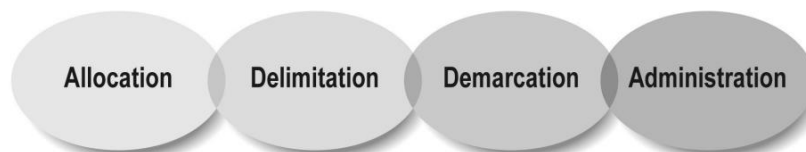
Natural borderlines along rivers, such as the Sanglang River on the border of Kedah-Perlis, the Muda River on the Kedah-Penang border, the Kerian River on the Kedah-Perak border, the Bernam River on the Perak-Selangor border, and the Endau River on the Pahang-Johor border, have not yet been defined as the interstate border. Although one river-based border has been established, the state government has not yet given it its blessing because of some unresolved concerns Kesang River (Melaka-Johor border). The Linggi River (Negeri Sembilan-Melaka border) on July 2, 2019, and the Sepang River (Selangor-Negeri Sembilan border) on July 4, 2022, are the only two river boundaries on which both state governments have reached an agreement. The maritime boundary MoU for the border between Negeri Sembilan and Melaka was also finished that year [20].

### 3. The Practice of the Border-Making

Countries, states, provinces, counties, cities, and municipalities are divided by political borders. It indicates the purview of a specific governmental body. A region's government is only allowed to enact and enforce laws inside its boundaries. Physical and political borders between nations or states typically line up. A threshold or limit beyond which two things become separate is also implied by this concept. The interstate natural boundary and maritime delineation process is seen as the border nations' main goal. With a few exceptions in Asia regions like Indonesia, the idea was created in the Western hemisphere, specifically in Europe, Canada, Australia, and Africa, to create a natural border demarcation to govern inter-state borders. In order to manage the interstate border sustainably, Malaysia is one of the border countries that has taken the initiative to establish natural and maritime boundary delineation.

A concept known as "interstate border demarcation" focuses on managerial and legal difficulties as well as technical elements for regulating activities and natural borders. The investigation continues with a review of state boundary demarcation history and the many definitions of state border delimitation and demarcation. It is determined how state borders were delineated and demarcated throughout the colonial era according to earlier studies. Natural boundary demarcation disputes involving antiquated agreements and systemic, technological, and governance issues have affected nations all over the world. Effective state border settlement has led to a sharp rise in border and coastal activities and development. As was previously mentioned, rising activity in border regions leads to overlaps in the Joint Border Committee's (JBC) and stakeholders' functions, rights, and obligations [8][21].

Donaldson [22] asserts that Stephen B. Jones proposes a hypothesis on a state's historical borders. According to Jones, a state's borders are created through the following four steps: allocation, delimitation, field demarcation, and management of borders. The process of identifying and demarcating a state's border has been discussed by many academics. Jones cautioned that while boundary-making is a continuous process that begins with the beginning stage and ends with the final stage of administrative allocation, faults in one phase will have an effect on the subsequent steps. As strategic tools for improving decision-making, conflict management, and the application of appropriateness in institutional boundary areas, state border delimitation and demarcation processes are also used [22]. Furthermore, Srebro and Shoshany [8] saw the process of establishing state boundaries as consisting of seven sequential steps: allocation, delimitation, demarcation, final delimitation, documentation, maintenance, and administration. By implementing these processes, institutional practice is based on integrated knowledge of the state boundary demarcation process, improving institutional participation, decision-making effectiveness, and the creation of long-lasting state boundary institutions. In order to defend state border management, reform state boundaries, act as an institutional management tool, and collaborate with other disciplines, the process of outlining state boundaries is essential for any institution that handles state boundary information. Despite the prevalence of river boundaries, according to Donaldson [23], the recently published literature on the subject is scarce and almost entirely produced from an international legal perspective. The most well-known studies from a geographical perspective are those by Bouchez, Schroeter, Caflisch, Gleditsch, Jones, and Srebro, and while they are still relevant today, little subsequent research has been done from this perspective. Figure 2 demonstrates Jones' notion of boundary-making.



**Figure 2.** Theory of Boundary-Making by Stephen B. Jones, 1945

According to Pratt [24], boundary disputes around the world are a hugely complex web of historical, geographical, cultural, and economic problems with important regional and even global ramifications. They additionally receive a lot of policy-focused attention and in-depth analysis from border researchers. Stephen B. Jones' Boundary-Making Theory, in Pratt's opinion, is a fundamental work of political and technical geography and remains the greatest practical manual for drawing international borders. River borders are also quite important. Riverine borders make up nearly a third of all land boundaries in the globe. River boundaries provide challenges for technologists in determining boundaries and policymakers in managing shared resources. Many international boundaries follow rivers for the majority of their length. River boundaries are largely uncharted territory.

The boundary represents the international normative idea of the boundary as the line of demarcation between two sovereign states and has a different meaning. At first, the boundary served as a buffer zone between empires or states, taking the form of a region that was primarily deserted and had few populated areas. Natural features like rivers, mountains, and coastlines act as the definition of natural boundaries, according to Mathieu Rigg [25]. The term "natural boundary" describes the spots on a region's border that serve as the beginning of a boundary line. It usually develops on its own and can seem like a mountain range, or a river. Physical borders between nations or governments are frequently followed by political boundaries.

The Indo-Bangladeshi river-border Complex, a Border-integrated Approach to Transboundary River Governance is an essay by Thomas [26]. It can also refer to a boundary between two political entities or a line dividing the territory of a nation. The vagueness of the term can still be easily understood by considering our border experiences, though. Indeed, persons who cross rivers and frontiers have real possibilities, and challenges [27][28]. The boundary has been one of political geography's distinguishing ideas since the late nineteenth century when it became established as an

institutionalized subfield of geography. Boundary delimitation, according to Paasi [29], refers to the process through which political bodies in a particular territory define borders, whether through conflict, colonization, or agreements/treaties. State borders represent the physical separation between political administration and state sovereignty in this review article.

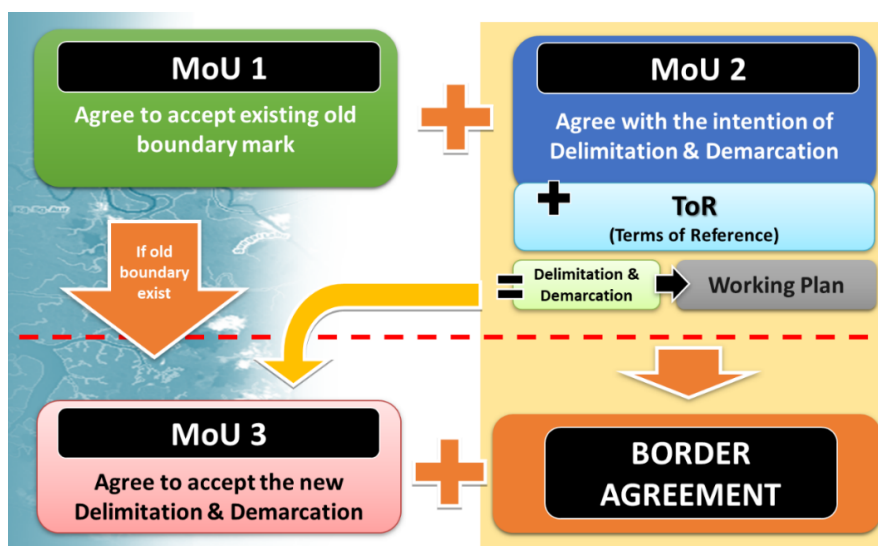
#### 4. Study Case

Before Malaysia gained independence, the British Administration began defining the borders between its states on the peninsula. The Anglo-Dutch Treaty, also known as the London Agreement, was signed in 1824, and the Federated Malay States were created by the British Empire in 1896. The Anglo-Dutch Treaty stipulated the delineation of the inter-state border in Malaya, as stated in the Land Code of 1926 published in the Federated Malay States Government Gazette. The *uti possidetis* principle, boundary treaty/agreement, and other international law processes, such as self-determination, establish a state's borders in international law [30][31]. It asserts that when a state dissolves or a province secedes from an empire, the boundaries of those territories cannot be altered [32-34].

The principles that form the basis for defining inter-state boundaries in peninsular Malaysia today are the Boundary Convention of June 20, 1891 (signed in London), the Bangkok Treaty of 1899 (Boundary Agreement), the Federation of Malaya Government Gazettes, the Memorandum of Understanding, correspondence between the Secretary of the Resident, the adjacent cadastral lots, and the main watershed [35]. According to Schedule 9, List 2 of the Federal Constitution's Article 74, the State Government is in charge of all land administration-related issues. As a result, the consent of both branches of the state government is required for the decision to delimit and demarcate state borders. Since 1993, a Joint Boundary Committee (JBC) has been in place for this purpose. These choices led to the formation of three (3) committees:

- National Joint Border Committee (NJBC), a joint national committee headed by the ministry's chief secretary;
- State Joint Border Committee (SJBC), which is presided over by the secretariat offices of the two bordering states; and
- Joint Technical Committee (JTC) is a technical joint committee that is jointly led by the directors of the two neighbouring states' State Lands and Mines Offices (SLMO).

The following Figure 3 illustrates the many stages of MoU development, the Term of References (ToR), and the Border Agreement that goes into finalizing the state boundaries.



**Figure 3.** Interstate Border MoU Flowcharts for Delimitation and Demarcation.  
Source: Cabinet Council meeting minutes, March 10, 1993.

#### 4.1. Procrastination Issues of Interstate Border Demarcation

Before independence was attained, the British colonialists determined the interstate borders in peninsular Malaysia and established them in a treaty. This decision has caused a number of questions. It is quite obvious that the state borders that were established at that time were merely drawn to protect their political and economic interests [36]. Establishing interstate boundaries is delayed for a variety of reasons. One of the reasons for the delay is that the state government does not prioritise defining and demarcating state borders as the top priority of state development [2][37][38]. After all, it doesn't generate income, unlike, for instance, the enforcement of taxes on mineral resources [39].

Several difficulties have been brought up by the decision to use the river as the state border. Due to river flow modifications that have not complied with the treaty, some state borders are challenging to determine in locations with natural river boundaries [9]. Oxbow lakes have been created as a result of some of the variations in river flow that have occurred along some state borders due to accretion and avulsion. The oxbow lake has dried up in some places [6]. Since 2011, the JBC has held multiple technical meetings, and the main reason for border demarcation delays has been variations in river flow. There are places along the Bernam River where the river flow has changed as a result of human activity. Since the 1940s, as depicted in Figure 4, the river stream has been straightened in the Gandasuli Island region for irrigation of paddy crops. The boundary between the two states has not yet been established, and neither has the river area that creates the oxbow. A dried-up river became state-owned land due to changes in its flow under Sections 49 and 353 of the National Land Code of 1965. The state government will suffer as a result of the invasion of land if the region is not clearly delimited. As seen in Figure 5, it also happens in the Sri Keledang region, where tin mining since the 1960s has altered the landscape and the river's former flow. The original state boundary, which was supposed to be in the middle of the Bernam River per the treaty, has been moved upstream 3.7 kilometers overall. Due to its distant location in the interior, the region is also vulnerable to encroachment on state government territory.



**Figure 4.** To facilitate irrigation, the river's flow has been straightened.

Source: Google Earth





**Figure 5.** Tin mining altered the Bernam River's old channel and the surrounding terrain in the 1960s.  
Source: DSMM aerial photography and Google Earth

The amount of time needed to look into the administration and the field was excessive. Because of this, the MoU is not signed until an agreement has been reached. The whole border sector could not be demarcated since survey work for boundary demarcation in the field could not be done until MoU 2 was signed by both states. Trust account funds will only be used for demarcation if both states have signed MoU1. The Joint Boundary Delimitation and Demarcation MoU1 and MoU2 were signed independently by Selangor and Negeri Sembilan on 4.9.2015 and 25.11.2015, respectively, regarding the status of the Selangor-Negeri Sembilan boundary. The demarcation of the Selangor-Negeri Sembilan border was finished on March 30, 2018, and the work plan for the defined state boundary was submitted to both state governments in 2019. On July 4, 2022, the final boundary agreement (MoU3) was signed; four years later, the DSMM delineated the border. According to the administration of Negeri Sembilan, the delay in the final boundary agreement was brought on by fluctuations in the flow of the Sepang River upstream. The border between states shouldn't be affected by a river's shifting path. Such adjustments ought to result in alterations to topographic and hydrographic maps as well as the pertinent legal documents that make reference to such boundary lines [40]. In addition, a number of issues, including institutional ones pertaining to efficient JBC, need to be researched in order to delimit the maritime boundary on the river's estuary properly. The most crucial component that requires additional study in order to complete state border delimitation and demarcation for state and national needs is an institutional issue. The interests of the stakeholders frequently overlap, which frequently results in conflicting obligations, limitations, and rights. According to Kevin Urama [41], the opposing rights issues may be resolved via collaboration across entire governments, academia, and communities.

#### 4.2. *The Memorandum of Understanding for Border Agreement between the state in Peninsular Malaysia*

In this paper, an agreement between two adjacent states is shown as a case study after a consensus is reached. For example, the content and wording of the Memorandum of Understanding for the Border Agreement (MoU1) of Selangor-Negeri Sembilan are as follows:

A MEMORANDUM OF UNDERSTANDING dated November 25, 2015, corresponding to 13 Safar 1437, MADE BETWEEN the State Government of Selangor Darul Ehsan (hereinafter referred to as

the "Selangor Government") as one party and the Government of Negeri Sembilan Darul Khusus (hereinafter referred to as the "State Government of Negeri Sembilan") as the other party.

WHEREAS the border between Negeri Selangor and Negeri Sembilan is based on 'Selangor Government Gazette No. 745,' which was gazetted on November 5, 1909, as shown in Appendix A and "Boundary Agreement Between Selangor and Sungei Ujong on February 10, 1878" as shown in Appendix B.

AND WHEREAS the Government of Selangor and the Government of Negeri Sembilan intend to mark, measure and determine the border between the two states.

THEREFORE, it is hereby agreed as follows:

1. For the purposes of this Memorandum of Understanding, there are two parts of the border between the State of Selangor and the State of Sembilan that will be delimited and demarcated by the Department of Survey and Mapping Malaysia and named priority areas I and II (hereinafter referred to as "Those areas") as shown in the attached Map No. 1. The estimated border distance for the areas is 60.8 kilometers.
2. For the purposes of delimitation and demarcation of the border between the state of Selangor and Negeri Sembilan, the Terms of Reference for delimitation and demarcation of the Joint Border are described in appendices.
3. Work on delimitation and demarcation of the border between the state of Selangor and Negeri Sembilan will be implemented by the Department of Survey and Mapping Malaysia. The entire border between Negeri Selangor and Negeri Sembilan will be delimited and demarcated according to the principles of delimitation and demarcation that the Cabinet agreed upon on March 10, 1993.
4. Expenses for handling border delimitation and demarcation works will be financed and jointly borne by the Federal Government as much as fifty percent (50%) and twenty-five percent (25%) by each State Government according to the actual expenses that will be determined by the Department of Survey and Mapping Malaysia.
5. An area with a width of three (3) meters and the border line of the two states should be used as a border reserve for areas that have not been given ownership rights.
6. The forest area is one hundred (100) meters wide from the borderline for each state to be determined later and should be maintained as a Forest Reserve and used as a boundary reserve for the catchment area.
7. Forestry departments in both states are required to maintain three (3) meter-wide stubs for the border reserve area from the border line of the two states.
8. Expenses for carrying out the work of surveying, locating and maintaining state border signs that are lost, damaged and shifted by the Department of Survey and Mapping Malaysia in accordance with the wishes of both states will be jointly financed and borne by the Federal Government as much as fifty percent (50%), and twenty-five percent (25%) by each State Government according to the actual expenditure to be determined by the Department of Survey and Mapping Malaysia.

The eight points mentioned above can be fulfilled without any issues. There is still a clause regarding the interests of both parties as an improvement in the content of the reference terms of the state border agreement, but the eight points listed above can be satisfied without any problems. However, the time before the Border Agreement (MoU) process above took too long due to several institutional issues, which unintentionally caused an increase in operating costs. Therefore, an institutional framework regarding the delimitation and other border-related issues is necessary.

## **5. Discussion and recommendation**

Since 2014, the Joint Border Committee has held a number of technical meetings. During these sessions, issues with shifting river flows have been cited as the primary reason for border demarcation

delays. Since it took too long to conduct both a field investigation and an administrative investigation, the MoU was not signed as long as a mutual understanding could not be achieved. Because survey work for boundary demarcation in the border sector could not be done until MoU 2 was signed by both states, the whole border sector could not be delineated. Trust account funds will only be used for demarcation when both states have signed the first MoU [11]. The state's border shouldn't be affected by a river's shifting path. In order for the demarcation work to be completed, either MoU 1 or MoU 2 should be able to be signed [44][27][6][9].

Another important reason for the delay in establishing the inter-state border was the change in the state government, which forced the postponement of the meeting to finalise the state border Memorandum of Understanding (MoU) signed by the two Chief Ministers of the state [8]. It is challenging to say whether the state's boundary-setting process, which is being overseen by the chief minister or Menteri Besar, is the source of the fragile political scenario. The drawing of interstate borders was profoundly altered by the change in political power. For instance, the transition of the political party in power in Perak has resulted in a number of postponements of the state border coordination meeting between Perak and Selangor since 2018 [45][46]. Therefore, judgements and solutions to problems that occur cannot be made, which indirectly raises the cost of demarcating interstate borders.

These conclusions show that the JBC's involvement in the interstate border committee has not led to increased efficiency since the current rules are inefficient because they are in contrast with accepted norms. Some roles are seen to overlap. If the rules deviate from the accepted norm, they won't be effective and may even result in expensive future transactions. The rules in use will have an impact on each variable in an action circumstance. The relationship between JBC and the action context determines how well interstate borders are delineated and demarcated. This interaction will make sure that the interstate border is drawn in a way that complies with the ruling and is recognized by all parties. The effectiveness of these interactions will depend on the rules that are in place, notably those that specify the participants, roles and responsibilities, rights and obligations, funding, and accountability. Analyzing the acceptable features of any regulations that may affect how the interstate border is demarcated will help gauge the capacity of the government that the JBC has constituted. In this situation, policy analysis might look at how consistently the composition guidelines have been applied and whether there is a disconnect between intended goals and actual results. The formation rules of the current JBCs must be examined for serious problems.

The management and use of interstate land and maritime borders are not explicitly addressed in Malaysian policy. It is not required that different organizations that oversee interstate borders in various spheres coordinate with one another. A lease that is issued without seeking advice from additional relevant authorities leads to disputes between multiple uses and obfuscates the decisions made by those other authorities [36]. Additionally, the interstate and maritime border governance are not well defined, which could result in a misunderstanding of the administrative boundaries between authorities and opposing maritime claims. Additionally, there is a dearth of knowledge regarding the JBC's imposed requirements and restrictions, as well as which ministry or agency issuing rights and licenses. As an illustration, having petroleum exploration leases overlap claims is not explicitly permitted by the law.

### *5.1. The Application of Effective Factors of Inter-State Border Delimitation and Demarcation Practice*

The ability of the management to meet the targeted goals within the allotted time is referred to as effectiveness in management. While efficiency relates to doing the task accurately, on schedule, and with the least amount of effort possible, effectiveness is concerned with accomplishing what is right or what should be done. When something is said to be successful, it either produces the desired or anticipated result or leaves a lasting, vivid impact.

Institutional effectiveness is the ability of a group or organization to achieve its objectives, to produce the specified quantity of products or progress, or to carry out its processes as efficiently as possible. Institutional effectiveness is important in determining whether an institution will experience long-term success. When an organization achieves this level of success, it can lessen waste-producing factors like old technology and ineffective procedures.

According to Donaldson [7], there are a few setups that must be made in order to modify current practices in order to form an efficient joint border commission or committee. Neighbouring governments must come to an agreement on a shared objective and muster the political will to establish a joint boundary commission or alter an existing commission to carry out this work.

Nevertheless, it is conceivable to provide some best practice recommendations that may assist nations establish an efficient joint border commission to accomplish the agreed-upon purpose based on the experiences and examples of existing boundary commissioners, particularly in Africa by Donaldson [7]. A new boundary commission, or the revision of an existing one, must address five major areas of concern.

#### *5.1.1. Constitutive Agreement*

The authoritative mandate, organizational structure, technical requirements, and dispute-resolution procedures will be described in more detail below. A boundary commission should be established or altered by a legally binding constituent agreement, such as a fully approved treaty because boundaries are crucial to each state as a whole.

A treaty, however, becomes a legally binding document if it is ratified, obligating both States to carry out the commission's mandate. Reports and conclusions of a boundary commission may be included immediately in the domestic laws of both States under a binding treaty. Establishing a commission via an inter-ministerial memorandum of understanding (MoU) or another less formal bilateral agreement may be simpler to get domestic political support for. Under a less formal agreement, good progress can undoubtedly be made if both states have strong political will. Imagine, though, that both States make a less binding promise. In such an instance, since the complete commitment of both governments is not embodied in a binding treaty, it might be simpler for the commission's progress to stall when a disagreement arises. In addition, if the work is carried out under a less formal arrangement or there is a lack of political will on either side, it could be challenging for the border commission's final reports or decisions to be confirmed by the respective governments.

Some academics, such as Pratt [24], Srebro [9], Nuhija [1], and Kokha [36], concur with this crucial point and contend that a definite treaty and agreement are required for the establishment of state boundaries.

#### *5.1.2. Authoritative Mandate*

The mandate issued to a joint boundary commission, defining its authority and jurisdiction, comes in second, and is maybe the most significant. The authority granted to a boundary commission can be positioned along a scale or spectrum, with a strong or direct mandate at one end and a weak or indirect mandate at the other. The pact will have clear wording outlining a robust mission. As is the case with the Nigeria-So Tomé and Príncipe Joint Development Authority established to administer their joint development marine region, the commission may be given a distinct legal personality to enter directly into contracts with any pertinent outside entities. Negotiations between the two delegations within the commission would be conducted under a strict mandate. They agreed that their judgements would be presented for approval to the highest echelons of their respective governments. The commission's decisions in this regard would be closely related to the domestic laws of the adjacent States.

A stronger mandate might state that a commission is directed by prior colonial agreements or papers, but it would still permit a commission to choose the boundary's most suited and agreeable route in the local border environment at the time. In boundary talks, a commission with a lax or ambiguous mandate will just provide advice. Such a commission is limited to gathering documentation and advising the relevant foreign ministries. In this instance, conversations take place outside of the commission itself through traditional diplomatic channels. Let's say a commission is unable to negotiate or decide outside of the traditional framework of international relations. In that situation, it is difficult to understand why a commission would even be necessary. Even if a commission with an indirect mandate is allowed to engage in discussions, it won't have much latitude to interpret documents. Instead, a limited mandate would instruct the committee to strictly construe the evidence and rigidly apply an antiquated border definition. This could easily result in issues if the earlier definition is vague or lacking. If there is any ambiguity in the definition of one of its components (such as documentary evidence or mapping), the commission may be instructed to interpret it strictly.

In those circumstances, it is unlikely that the commission will resolve any divergent definitional views.

The mandate, role, and responsibilities given to a country's commissions should reflect the political will of that country to reach an agreement with its neighbours, according to Jerome Bouyjou [27]. Under the supervision of pertinent ministries and in consultation with parliaments, the commission should be given the full authority to represent its country's interests and negotiate on its behalf. This can be accomplished, according to Kokha [36], by reaching a political agreement, establishing an appropriate institutional framework, defining the mandate of the boundary commission and other pertinent bodies, securing financial, human, and technical resources, training staff, and planning by the joint boundary commission, which includes compiling all pertinent materials, deciding on common standards, creating a work plan and timetable, as well as putting a programme into place.

### 5.1.3. Operational Structure

Third, the commission's organizational design is a key component of its efficiency. The general organization of the majority of the present joint border commissions in Africa is comparable and includes three distinct levels:

- i. Joint ministerial council;
- ii. Joint technical committee/commission;
- iii. Technical field sub-teams.

The ministries of foreign affairs, interior, lands, customs and immigration, and defence will normally make up the joint ministerial council, which will be composed of an equal number of officials from both States. Even if the names of the various levels may vary, the joint ministerial council will be required to approve the work and reports given by the boundary commission.

The adjacent States are free to select how to set up the boundary commission as long as it has the political clout and technical know-how to accomplish the panel's predetermined goals. Before the mid-late 20th century, border commissions typically did not have a council of ministers, so the lead commissioners frequently had a lot of power.

Since it is typically in charge of organizing and carrying out the work necessary for recovering, defining, and demarcating a border, the joint technical commission/committee is the beating heart of the boundary commission [7][42][50]. The joint technical committee may have a wide range of representatives, although the respective surveyor generals or national boundary commissioners will typically serve as its chairmen. The heads of the joint technical commission should ideally be assisted by a small core team with a good balance of pertinent technical training and abilities (surveying, legal, political, GIS, etc.). The two commissioners must be well-respected in their respective administrations in order to request information and support from various ministries, departments, and organizations. The ministerial council or even the heads of state will typically be consulted to address any disagreement or controversy that the joint technical committee leaders are unable to resolve. If a resolution cannot be reached, disputes should be referred to a specific dispute resolution system.

For the border commission to be a success overall, the two joint technical committee leaders' relationship is essential. Even now, certain permanent joint technical commissions dealing with boundary management concerns are still chaired by surveyors, such as the Canadian Commissioner on the IBC who also serves as surveyor-general of Canada Lands. Boundary commissions are increasingly frequently headed by representatives from the foreign ministry, though. A background in surveying can give a commissioner more technical abilities for demarcation fieldwork and border mapping, but a background in diplomacy or politics may give a commissioner more political power within his or her particular government. A commissioner should ideally have considerable political clout and diplomatic abilities in addition to surveying knowledge and experience. The function of the border commissioners might be crucial in maintaining momentum within the commission, depending on the mandate assigned to them and their unique qualifications. The commission will be considerably more likely to come to an agreement if the two chief commissioners can establish a good working relationship based on trust.

The joint technical commission typically creates a number of subcommittees to carry out specific responsibilities, like gathering historical information, surveying and mapping,

engaging/sensitizing local borderlands, and delineation. These subcommittees generally draw their teams from nearby border regions and may conduct fieldwork or form collaborative working teams.

#### 5.1.4. *Technical Specifications*

Fourth, the technical requirements associated with border demarcation and mapping should be as clearly outlined in the agreement creating the boundary commission as practicable. If demarcation is part of a border commission's duty, it is generally desirable to come to an agreement on the size of the boundary pillars/marks and some rules for the frequency of pillars in advance. If boundary mapping is required, it may be more efficient for the commission if matters such as a common geodetic datum, scale, and cartographic specifications (language, place names, formatting, etc.) are all outlined in the initial agreement or accepted by the commission [43]. Technical specifications could take a commission a lot of time and goodwill to negotiate if they are not included in the constituent agreement. Thus, the expertise of the land surveyor is required. As a result of the land surveyor's in-depth technical expertise in border delineation issues, Adler referred to him as a boundary engineer.

According to Srebro [21], a joint team of experts should be present in the JBC because professional members share a common technical language and are used to working in teams; as a result, once their duties are clear, the level of suspicion among them is much lower than among politicians, and as the work of the cooperative progresses, the level of confidence increases, which significantly aids in the implementation of the task. Through to the opinion of Mangku [47], Boundary delimitation calls for external specifications that specify the work's scope, technical specifications for each task's description and physical requirements, and time allotted for the cycle of boundary making (surveying, construction, and mapping), allowing internal specifications to specify the actual operational requirements of boundary administration [48].

The organizational (ISO 9000 family) and technical ISO quality requirements (ISO 19100 family), which are used to standardize geographic information and define demands and purposes in the boundary documentation and mapping production processes, were also added by Sayel et al. [48] to improve the procedure. In general, user requirements are the most important consideration when putting quality standards into practice.

#### 5.1.5. *Dispute Resolution Mechanisms*

Fifth, the fundamental agreement that creates or amends a boundary commission charged with recovering and/or re-demarcating a previous border definition also includes methods for dispute resolution as a significant component. The boundary commission itself is designed to function efficiently as a border dispute settlement tool unless it is designated specifically to operate as an arbitral tribunal. According to the overall design of the boundary commissions operating in Africa right now, if a disagreement arises within the joint technical commission over the interpretation of data, whether it be documented or physical, it is then sent to the joint ministerial council for a decision. In order to move forward, it is ideal that these differences will be settled through discussions within the joint ministerial council and communicated to the joint technical committee. But imagine a combined ministerial council is unable to settle a dispute that could halt the commission's efforts. The constitutive agreement should, in that instance, specify extra dispute settlement procedures.

The number of non-binding and binding third-party processes for dispute settlement should be specified in the basic agreement. More efficient techniques will produce conclusions on disagreements that are binding on both parties. Involving disinterested third-party governments may also provide outside political influence that could help resolve a dispute, and third-party suggestions, such as those of independent mediation commissions, may contribute fresh perspectives or experiences. Weaker forms of resolution include resolving issues by referring to non-binding dispute resolution processes that do not require third-party engagement and referring to dispute resolution mechanisms that do not specify third-party involvement

- i. Negotiation;
- ii. Consultation between the parties;
- iii. Standard diplomatic channels; and
- iv. Through some method to be defined by the two parties.

In fact, the boundary commission itself should engage in discussion and consultation. Imagine that a commission's parties are unable to agree on a particular interpretation or nuance. It is doubtful that the conflict would be settled through dialogue, consultation, or conventional diplomatic procedures in that situation. Furthermore, these concepts and expressions are frequently too unclear for the parties to use as efficient dispute-resolution tools if they are left unsettled.

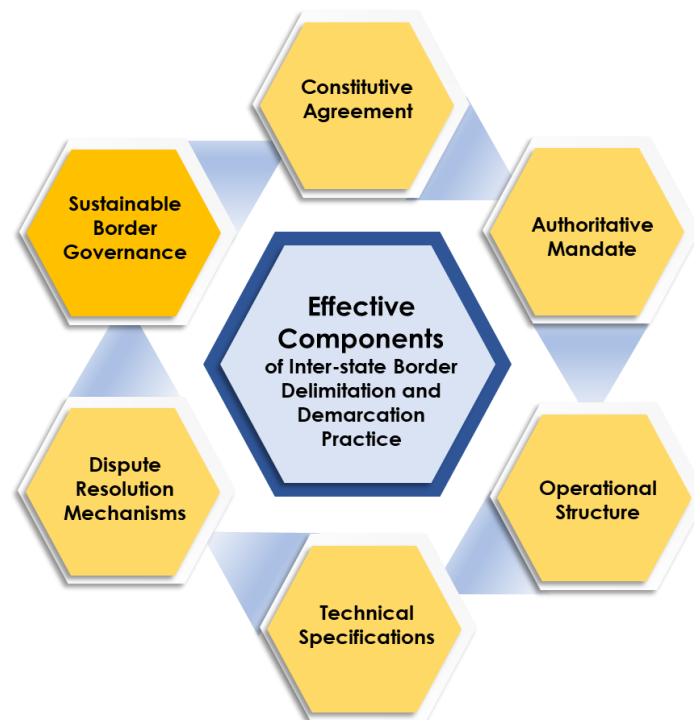
If a border commission's constitutive agreement has fewer ineffective types of non-binding tools, it may be more difficult for it to resolve a specific problem and continue working. Two States show a greater commitment to resolving any concerns and having the commission come to a successful conclusion when they create a commission and stipulate binding dispute resolution procedures. As a caution, dispute resolution procedures are designed to remove obstacles to progress; otherwise, the commission would experience severe delays and would incur significant costs from both governments. Therefore, instead of moving straight to adjudication, it could be advantageous for an agreement to provide a variety of conflict settlement procedures. As an illustration, the constitutive agreement of a commission can provide the following stages of resolution:

- a) Negotiate a settlement to conflicts.
- b) The parties may request the mediation of a particular person if a resolution cannot be found through negotiation.
- c) If mediation is unsuccessful in resolving the issue, the parties may refer the matter to a designated conciliation commission, which will make non-binding settlement recommendations.
- d) Assume that the suggestions of a conciliation commission are rejected by both parties. In that situation, the International Court of Justice will be asked to settle the disagreement, and all parties will recognize its ruling as final and binding.

The two States are able to exercise significant control over the settlement through a variety of dispute-resolution processes. When a dispute is resolved by arbitration or adjudication, a court or tribunal takes over as the controlling party instead of the two parties. This does give the disagreement a binding conclusion (as agreed upon by the parties), but it could still leave some issues open.

#### *5.1.6. Additional Components of Effective Factor for state border delimitation and Demarcation Practice; Sustainable Border Governance*

Based on the 42 respondents from the Joint Border Committee, 20 respondents (55%) suggested that Sustainable border governance needs to be focused on as an effective component of Perak-Selangor and Negeri Sembilan-Selangor border demarcation practice. The other four factors that may lead to the effectiveness are Personnel knowledge (26%), Political intervention (14%), and Institution awareness (5%). However, the leading institutions had covered the components of Personnel knowledge, Political intervention, and Institution awareness even though it is not at the maximum level for the enhancement of Perak-Selangor and Negeri Sembilan-Selangor border delimitation and demarcation practice. Moreover, the institution's awareness has been the priority in the development of the plan. Since Sustainable border governance is highlighted as the additional important component among the respondents, the effective components are shown in Figure 6, and the additional component is highlighted in the orange box.



**Figure 6.** The Effective Components of Interstate Border Delimitation and Demarcation Practice

Sustainable Border Governance was mentioned following the issue of natural border management and natural resource management suggested by most respondents in the border institutions of the Perak-Selangor and Negeri Sembilan-Selangor JBC. As we all know, rivers are the primary source of irrigation, fishing, agriculture, sand mining, and navigation. When the river becomes the state border, the struggle for common pool resources will occur if the state border's demarcation is not precisely determined on the ground. The enforcement of natural resource management by state borders, as well as other effective elements for planning practices at natural state borders that support the 15th SDG goal of conserving life on land, should be prioritized. Its objectives include stopping biodiversity loss, protecting and restoring terrestrial ecosystems, managing forests sustainably, preventing desertification, and halting and reversing land degradation. According to the previous treaty, the state's natural borders are the middle of Sungai Bernam (Selangor-Perak) and Sungai Sepang (Selangor-Negeri Sembilan), which are rich in natural resources in the riparian area.

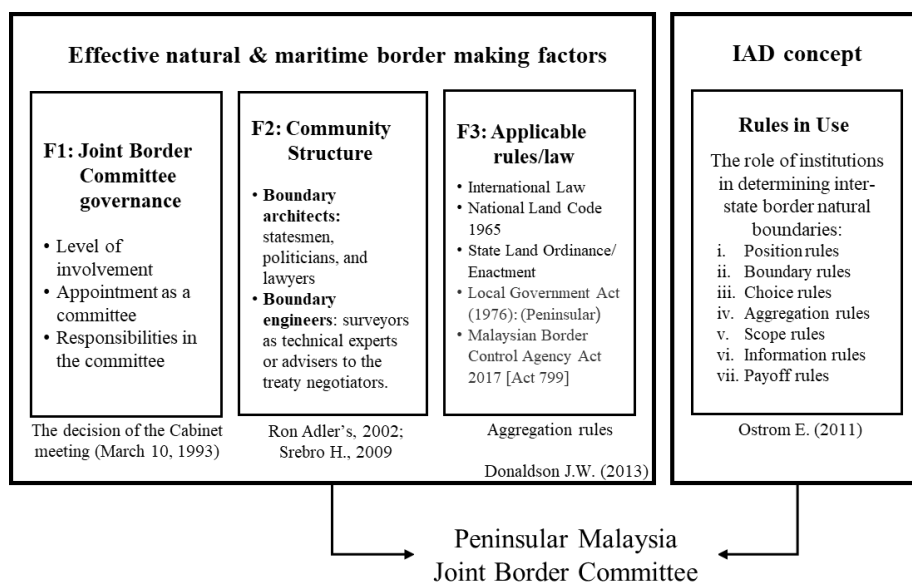
The result obtained on the effective components of state border-making practice based on the Selangor-Perak and Selangor-Negeri Sembilan JBC practice is parallel with the five components highlighted in the study proposed by Donaldson [50] that the effective state border-making is determined using five main indicators, which is (i) Constitutive Agreement, (ii) Authoritative Mandate, (iii) Operational Structure, (iv) Technical Specifications, and (v) Dispute Resolution Mechanisms. However, the applicability of the findings proposed by Donaldson is based on the case study in Africa. For peninsular JBC practice, there is an additional component that needs to be focused on by the committee, which is Sustainable Border Governance. Sustainable border governance is defined as ongoing oversight even after the delineation is finished to effectively conserve common pool resources along the state's natural borders. To ensure that border laws and regulations are continually followed and cared for by the public for economic and environmental well-being, state border markings must continue to be maintained.

The delay in state borders demarcation impacts the perception of Selangor State and Negeri Sembilan as the main corridor of the Greater Klang Valley; it is not an isolated issue. Moreover, law enforcement derives from the common pool resources governance issues highlighted by the Minister



of Natural Resources and Environment of Malaysia in his opening speech at The Memorandum of Understanding Ceremony of the Selangor-Negeri Sembilan State border agreement held on July 4, 2022. The delay in state borders demarcation impacts the image of Selangor State and Negeri Sembilan as the main corridor of the Greater Klang Valley; it is not an isolated issue when dealing with the environment of economic progress at the state border [3][4]. Department of Survey and Mapping Malaysia stated that the Selangor-Perak border discussion had started in 2011 [48]. Still, the issue of changing the course of the Bernam River seems to have continued since then.

The conceptual framework proposed to form an effective natural and maritime interstate border is shown in Figure 7. The well-managed system will be used to develop an institutional analysis and development framework for the state's natural and maritime borders delimitation and demarcation process.



**Figure 7.** The conceptual framework for peninsular Malaysia's effective natural and maritime interstate border delimitation and demarcation.

## 6. Summary and conclusion

Due to the ambiguity and uncertainty of the inter-state border remnants from the colonial past, urban development planning near the state boundary will be difficult for local authorities and planners to implement [3][4]. The demarcation of state boundaries will facilitate the preparation of long-term planning plans in cities situated on the borders of the two states. Boundaries must be finalized through boundary agreements in order for PLANMalaysia to prepare structural plans for development at the district and state levels based on already-existing legal provisions, such as the Town and Country Planning Act 1976 (Act 172) and the Structural Plan Rules. Without the completion of state border demarcation and base map by the DSMM, PLANMalaysia finds it challenging to plan development due to the overlap of jurisdiction by the various government agencies.

Because it encompasses issues of state sovereignty, duplication of authority, enforcement, legislation, and state economics, the current SOP has to be enhanced and improved. Ineffective governance of natural resources across state borders will continue to cost the country money as long as state boundaries are not demarcated. Based on the result in identifying the effective components, the respondents proposed an additional component: Sustainable Border Governance, concerned with overharvesting the natural or common-pool resources management in the border area of Selangor-Perak and Selangor-Negeri Sembilan. Further research can be carried out among the Committee for

natural resources management solutions. The framework for solutions must be developed. It is to ensure fair and equitable development without the issue of overlapping enforcement areas.

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