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STRATEGIC MANAGEMENT OF INVASIVE PLANT SPECIES WITH REFERENCE TO THE ROLE OF AGRICULTURAL QUARANTINE ON THE PREVENTION OF TRANSBOUNDARY MOVEMENTS.

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ABSTRACT

In recent years, invasive plant species have become a high-profile policy topic for the Indonesian communities at the national levels which have emphasized the need cross sectoral coordination between competent institutional and stakeholders at all levels. As it has been indicated that a number of invasive plant species has seriously invaded ecosystems such as water hyacinth (Eichornia crassipes) in Rawa Pening reservoir at Central Java, Siam weeds (Cromolaena odorata) in Savana at Kupang, and Morning glory plants (Merremia peltata) in Ujung Kulon National Park and South Barisan hill National Park. These might be need cross sectoral effort to reduce their population. Indonesian Agricultural Quarantine agency is one of the inter-institutional agency which has been mandated to prevent trans-boundary movement of invasive plant species. Prevention effort of invasive plants species introduction in to the Indonesian territory through implementation pre-border actions such as pre-shipment inspection, recognition and pre-clearance of the consignments in a source country. While, at the point of entry, border controls and quarantine measures need to be used to prevent or minimize the risk of introducing invasive plant species that could become invasive. To manage post-border action of invasive plant species, Ministry of Environment in coordination with other agencies currently prepare a National Strategy and Action Plan for management of invasive alien species (IAS). This concept is consisting of status, strategy and plan of action of invasive alien species in Indonesia. Through plan of action such as prevention, mitigation, and eradication of invasive plan species in some infested ecosystems can be reduced their population.

Keywords: Quarantine, trans-boundary, and Invasive plant species.

INTRODUCTION

The introduction of invasive plant species beyond their natural range is rising sharply, due to increased transport, trade, travel and tourism and unprecedented accessibility of goods resulting from globalization. These activities provide vectors and pathways for live plants, animals and biological material to cross biographical barriers that would usually block their way. These might be have significant environmental, economic and public health impacts and present a significant risk of the wholesale homogenization of
ecosystems (Genovesi and Shine, 2003). In recent years, invasive plant species have become a high-profile policy topic for the Indonesian communities at the national levels which have emphasized the need cross-sectoral coordination between competent institutional and stakeholders at all levels. As it has been indicated that a number of invasive plants species are seriously invaded ecosystems such as water hyacinth (*Eichhornia crassipes*) in Rawa Pening reservoir at Central Java, Siam weeds (*Cromolaena odorata*) in Savana at Kupang, and Morning glory plants (*Merremia peltata*) in Ujung Kulon National Park and South Barisan Hill National Park. These might be need cross sectoral effort to reduce their population.

Indonesian Agricultural Quarantine agency is one of the inter-institutional agency which has been mandated to prevent trans-boundary movement of invasive plants species. Prevention effort of invasive plants species introduction in to the Indonesian territory through implementation Pre-border actions such as pre-shipment inspection, recognition and preclearance of the consignments in a source country. While, at the point of import, border controls and quarantine measures need to be used to prevent or minimise the risk of introducing invasive plant species that could become invasive.

To manage post-border action of invasive plant species, Ministry of Environment in coordination with others agency currently prepare a National Strategy and Action Plan for management of invasive alien species (IAS). This concept is consisting of status, strategy and plan of action of invasive alien species in Indonesia. Through plan of action such as prevention, mitigation, and eradication of invasive plan species in some infested ecosystems can be reduced their population. Thus, the objective of this paper is to elaborate inter-agency's responsibilities for management of invasive plant species.

**THE ROLE OF AGRICULTURAL QUARANTINE**

Prevention between and within Indonesian territory is generally far more cost-effective and environmentally desirable than measures taken following the introduction and establishment of an invasive plant species. They should be given priority as the first line of defense. Prevention effort need to begin at the place of origin or export (before living organism crosses the biogeographically barrier). Prevention at source is particularly important where there are known is incursion and where interception of species may be difficult due to consignment are packed into containers in a source country and transported to dispersed estimation, often remote from traditional inspection sites at entry points.

At the point of import, border controls and quarantine measures need to be used to prevent or minimize the risk of introducing invasive plant species that are or could become invasive. This requires a framework of rules, trained staff, reference lists of species and risk goods, technical procedures and surveillance.

Agriculture quarantine agency may play an important role in trans-boundary movement of invasive plant species through strengthening quarantine regulations as clearly stated in Law of 12 of 1992 concerning Fish, Animal, and Plant Quarantine, Government Regulation Number 14 of 2002 concerning Plant Quarantine, Minister Decree Number 93 of 2011 concerning List of Quarantine pest, carrier and distribution, and currently under proposed of regulating of the prevention of movement of invasive plant species in to Indonesian territory (Table 1).
Current Quarantine policies for the prevention on the trans-boundary movement of invasive plant species is through implementation pre-border, at-border, and post-border of quarantine activities (IPPC, 2004).

Pre-border of quarantine activities may consist of preshipment, quarantine recognition, and quarantine pre-clearance. The inspection of consignment is conducted in the point of exit prior to import. These might reduce the movement of invasive plant species due to an intensive of quarantine inspection. Pre-border quarantine action means in intensive of quarantine inspection at the point of entry to the consignments which do not conducted by pre-border quarantine actions. These activities may consist of strengthening quarantine action such as inspection, detention, refusing, destroying or releasing. Quarantine inspection at the point of entry may require dedicated quarantine installation or premises, to minimize the escape of invasive plant species associated with consignments. While, Post-border quarantine activities means an inspection of consignment after at-border activities was done through intensive monitoring and surveillance, increase early warning systems, and rapid response in case of any explosive of invasive plant species in the fields (Table 2).

Table 2. Quarantine management of action for prevention of trans-boundary movement of invasive plant species

<table>
<thead>
<tr>
<th>No</th>
<th>Place of Inspection</th>
<th>Activities</th>
</tr>
</thead>
</table>
| 1  | Pre-border         | -Pre-shipment inspection;  
|     |                    | -Recognition of invasive plant species free areas; and  
|     |                    | -Pre-clearance                                                           |
| 2  | At-border          | -Quarantine action (inspection, detention, refusal, destroy or release);  
|     |                    | -Quarantine installation                                                 |
| 3  | Post-border        | -Monitoring and surveillance of invasive plant species;  
|     |                    | -Early warning systems;  
|     |                    | -Emergency/rapid response -Control measures                              |

Unintentional movement of weeds seeds and or invasive plant species through importation of grain crops such as wheat grain has shown that some weed species such as *Polygonum convolvulus*, *Brassica nigra*, *Lolium perenne* and *Avena fatua* were the most frequent weeds intercepted in the wheat grain (Table 3).
*Polygonum convolvulus* has been evaluated based on Weed Risk Assessment (WRA), and has been recommended to be refusal its presence in Indonesia (Tasrif and Sahrir, 1999). Taking these results of into consideration, it was concluded that attention should be given to the possible introduction of invasive plant species through seed consignments. Tasrif and Sahrir (1999) reported that *Cencherus echinatus* has been intercepted in wheat grain importation from Australia. Currently, this new weed has been found and become a problem in abandon areas of Makassar, South Sulawesi Province (Tasrif, 2013, unpublished data).

**INTER-AGENCY COOPERATION ON IPS AND ITS MANAGEMENT**

Currently, the Government of Indonesia is under finalized the draft of the National Strategy and Plan of Action of Invasive Alien Species (IAS). The drafts of management status of IAS/IAPS are consist of Policy and law and regulation of IAS/AIPS, research, Management institutional, information systems and data base, economic policy, public awareness and networking through international cooperation and agreement (MoE, 2012).

The establishment of some invasive plant species such as water hyacinth (*Eichhornia crassipes*) in Rawa Pening reservoir at Central Java, Siam weeds (*Cromolaena odorata*) in Savana at Kupang, and Morning glory plants (*Merremia peltata*) in Ujung Kulon National Park and South Barisan Hill National Park These might be need cross-sectoral effort to reduce their population. Control and Eradication program could be taken into consideration sooner, as well as public awareness, otherwise, those invasive plants species may become a serious impacts on economic lost and environment.

Table 3. Weeds intercepted through the trans-boundary movement of wheat grain in 2012 to 2013 *).

<table>
<thead>
<tr>
<th>No</th>
<th>Commodities</th>
<th>Country of Origin</th>
<th>Weeds Intercepted</th>
</tr>
</thead>
</table>
| 1  | Wheat grain | Australia         | 1. *Avena fatua*  
2. *Lolium perenne* |
| 2  | Wheat grain | Canada            | 1. *Avena fatua*  
2. *Brassica nigra*  
3. *Polygonum convolvulus*  
4. *Linum utilissinum*  
5. *Paspalum sp.* |
| 3  | Wheat grain | India             | 1. *Avena fatua*  
2. *Brassica nigra*  
3. *Paspalum sp.* |
| 4  | Wheat grain | USA               | 1. *Avena fatua*  
2. *Lolium perenne*  
3. *Polygonum convolvulus* |

*) Data collected from Makassar Agricultural Quarantine Service, 2013 (unpublished)

**CONCLUSIONS**

The most common approach to preventing introduction has been to target individual species for quarantine in pre-border and at-border activities. Species based quarantine systems are conducted to anticipate risk before harm actually occurs, or to address the unintentional introductions that comprise the majority of invasive plant species introductions.

Meanwhile, managing invasive plant species is thus becoming more challenging and will be a lengthy mandate. Risk and impact assessments, early detection and monitoring and implementation of effective control measures in the Post-border area highly dependent on the availability of information that can keep pace with new invasion threats.

**LITERATURE CITED**


MoA, 2011. Minister Decree Number 93 of 2011 concerning List of Quarantine Pests, hosts and distribution area (In Indonesian).
