The Relationship between "Excoecaria Indica" Tree Growth and Flooding Control Along the Sungai Kelantan Bank

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ABSTRACT

At the present time, lots of river bank woodland reserve have been demolished and replaced by improper residential and agricultural development later devoid of concern about its effect in the next future. Trees and river woodland reserve function as natural barrier and absorber of the excess water during the flood. Several studies have shown that the river bank woodland is likely to show complex transient responses to rapid changes in climate especially after the mega disaster of flood. It is well known that tree establishment and growth rates are modified by the particular species which function to control the local environments climate especially during the climate change such as, flooding and drought. Although considerable research has been devoted that, the tree from ‘Rhizophoraceae’ family is perfectly found to control the overflown water during the flood seasons. This studies aim to identifying the role of ‘Excoeceria indica’ tree growth and its function to control the overflown water during the flood. A case study method was conducted by some evidences such as documented analysis, site observation and other related resources in collecting data on the relationship between ‘Excoeceria indica’ tree growth and its functions by case study in Sungai Kelantan bank.

INTRODUCTION

‘Ecosystem solutions’ are plants and animals that influence their surroundings. ‘Excoeceria Indica’ helps to construct dunes, silt accumulates around water that catch plants, and freshwater mussels build reefs and bind sediment along the river bank. These organisms can help to make flood defense systems more effective. In light of the expected climate changes and rise in sea levels, the Sungai Kelantan Area Delta programme has been seeking new ways of keeping the river bank and coast safe. The programmer includes identifying the ecosystem solution present in the Sungai Kelantan and how they can play a role in flood protection in the long term. There were already many ideas regarding their deployment but a complete overview was needed.

According to the issues the important of trees and woods in reducing the risk of flooding was recognized in Natural Environment White Paper [6]. The improper development along the Sungai Kelantan bank is a common problem in which the developers cut off the existing tree and forest along the bank without planning. Trees and forests function as natural barrier and absorber of the excess water during the flood. Several studies have shown that the river bank forests are likely to show complex transient responses to rapid changes in climate especially after the mega disaster of flood. It is well known that tree establishment and growth rates are modified by the particular species which function to control the local environments climate especially during the climate change such as, flooding and drought. Although considerable research has been devoted that, the tree from ‘Rhizophoraceae’ family is perfectly found to control the overflown water during the flood seasons. Several studies from proven evident have shown that the ‘Excoeceria Indica’ undeniably has identical boundless of water absorption rate. Based on the research questions and objective, a mix mode methodology fits into this study.

In this study, subject are not going to be controlled, hence an experiences method is not an appropriate choice to reach the objective. This study is a measure of ‘Excoeceria Indica’ or locally named as ‘Pokok Gurah’...
is perfectly found to reduce the overflown water during the flood seasons; therefore trees growth survey is most appropriate to be used. Hence of that the observation method are also used to see how far these tree are really effective in role to reduce the risk of flooding by reducing run off, improve water quality by filtering out pollutants and reduce the risk of overflown flooding by case study in Sungai Kelantan bank. Based on the severity of damage along the river bank during the flooding, species were classified as ‘Rhizophoraceae’ genuses are less damage then the other species. This studies aim to identifying the role of ‘Excoeceria Indica’ tree growth and its function to control the overflown water during the flood. A case study method was conducted by some evidences such as documented analysis, site observation and other related resources in collecting data on the relationship between ‘Excoeceria Indica’ tree growth and its functions by case study in Sungai Kelantan bank. At the top of the end of this study, continuous monitoring policy change and management interventions must be triggered to target to control and protect invasive plants in Sungai Kelantan bank.

2.0 Literature Review:
2.1 The roles of trees to reduce the overflown flooding:
The important of trees and woods in reducing the risk of flooding was recognized in NEWP, overflown water is the major cause of flooding in towns and cities [1]. However, preliminary results from research by Manchester University indicate that trees can help reduce overflown water by as much as 60% compared to with asphalt. Three decrease the rate at which rainfall reaches the ground and run off into watercourses and drain. In both urban and rural areas this allows more time for natural and manmade drainage systems to take water away, reducing the likelihood or severity of rivers flooding or surface water inundating homes [3]. Woodland can also create a sponge affect [4]. This means that water can infiltrates into the soil and then be stored there. The lack of soil disturbance and recycling of leaves and other dead material from trees in woodland leads to an increase in soil organic matter and development of soil structure with natural channel and pores [8]. The studies at Pont Bren in Wales have shown that infiltration rates were up to 60 times higher in young native woodland compared to neighboring grassland. According to [1] the importance of natural processes in flood defense was recognized in Pitt Review, particularly in dealing with small scale flooding events.

2.2 Improving the quality of water system:
Woods act as filters, removing damaging pollutions from rivers that run through them. Correctly situated trees can also stabilize river bank. This would protect against erosion and further pollution [2][10].

2.3 Strength of the defenses:
Ecosystem solution can help to strengthen flood defense systems. Marram grass stabilises and raises the dunes in the Wadden Islands, which is why they have been used in coastal protection for centuries. Saltmarsh plants accumulate mud, allowing vertical growth in the mudflats [7]. The extra layer of clay helps to reduce seepage and piping erosion, making a dike more stable. The importance of saltmarshes is well known but needs to be given more attention in formal evaluations.

2.4 Wave dumping:
During storms, wave damping occurs in shallow waters. Saltmarshes have this effect even during extreme storms. Banks of molluscs (shellfish such as mussels and oysters) reduce wave intensity if the water is not so high. They also trap sediment in the Wadden Sea with the result that shoals (sandbars) build up and the waves do less damage to the flood defences. The advantage of wave damping is that the flood defences do not need to be so high or so strong [7][5].

3.0 Methodology:
This synthesis relied on ground based research work including selected interviews and information collected from different research findings, some of which was gray literature, while others were publications from different peer reviewed journals or periodicals etc. Information was also gathered by attending workshops, seminars conferences and visiting research institutions and meteorological stations. Some information was collected directly from the stakeholders, rural and urban administrative bodies, farmers and NGOs. The impacts of floods on Sungai Kelantan bank and their bearing on climate change were studied and the traditional coping practices have been investigated; their efficacy is highlighted and compared with present practices to find out the mistakes as well as to integrate the scientific basis of the traditional knowledge regarding natural and artificial mechanism followed by the people of the most vulnerable region of the earth for thousands of years. This study has tried to ventilate the neglected and overlooked facts on ‘Rhizophoraceae’ species in Sungai Kelantan in role to reduce the impact of overflown flood. The study also provided recommendations on how to develop an appropriate plantation policy.
RESULTS AND DISCUSSION

This section examines the physical factor of vegetation that contributes to the townscape character of the cultural & heritage waterfront in Melaka. The vegetation in Melaka waterfront is considered unique compared to their old counterparts due to the significant differences in character in the form of canopies, function, characteristic, image, identity and meanings attached to the area by residents. What sets them to be unique from the newer centers and the other waterfront townscape is also the sense of vitality through the human activities that take place on the street and the relationship between the buildings and the outdoor spaces fronting the street. An art of relationship between the buildings and their juxtaposition with the street is observed in historic townscape where the tree and its canopies form often become important focal point that characterize the view one can enjoy in the cultural & historic waterfront townscape. The sense of variety within uniformity is one of its strong features that make the cultural & heritage waterfront townscape different than its counterpart and having a stronger sense of place. Forests the world over, have long been associated with helping to reduce flooding. Most flooding disasters have been partly blamed on the effects of deforestation. A 'Rhizophoraceae' species is used to protect the river bank in Sungai Kelantan. Previous mega floods were washed away the earthen dikes along the Sungai Kelantan bank. A natural barrier could be built to break the wave dumping. The natural process could be used to help build this barrier. A temporary wall of sand block could be placed in front of the bank line, before planting the 'Excoeceria indica' to protect the trees from vanishes by the wave dumping. Mussel will start living behind this wall, which creates a semi-natural freshwater reef. Behind this wall, 'Excoeceria indica' could be planted freely. This 'Rhizophoraceae' species would break the wave dumping before they reach the residential. On the other hand, this species will strengthen the defenses along the bank, improving the qualities of water system and reduce the overflow water during the flooding. We noticed that trees are not just for shade and wind breaker during the storm [9], at the same time, this barrier will form a natural habitat for local freshwater species, which the local populations could eat or sell to generate some extra income.

Table 1: The relationship between ‘Excoeceria indica’ tree growth and flooding control along the Sungai Kelantan bank.

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<th>Characteristic of ‘Excoeceria indica’</th>
<th>Roles of ‘Excoeceria indica’ in flooding control</th>
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| Tap root and fibrous root            | 1. Stronger structure of root to hold the soil along the bank from the erosion during the wave dumping  
2. Fasten in role to absorb the overflowed water  
3. As a homes for freshwater and shrubs habitats  
4. Improve the water qualities |
| Hard wood                           | 1. Strength of the defences along the bank |
| Structure of crown                  | 1. Increasing survival of offspring  
2. Wind breaker  
3. Climate control |

Conclusion:
An invasive species of ‘Rhizophoraceae’ which well-known, or would seem, to require positive effect on river bank ecosystem. This ‘Rhizophoraceae’species shake the river woodland ecosystem through the variants way. Nevertheless, extensive in-depth long term study on the ‘Rhizophoraceae’ species of ‘Excoeceria indica’ and their positive impact need to be further studied and monitored continuously. A proper policy formulation and management interventions also need to be triggered targeting the control of the invasive plants of ‘Rhizophoraceae’ species.

ACKNOWLEDGEMENT

I would like to express my highest gratitude to Ministry of Education for granting the fund of FRGS Flood Management Grant and my role of supervisors in the research project for their continued support and encouragement: Dr. Mohd Yazid bin Mohd Yunos, Dr. Nangkula Utaberta and Dr. Nor Atiah Ismail, Dr Nor
Fazahmima and Dr Sumarni. I offer my sincere appreciation for the learning opportunities provided by my committee.

REFERENCES


