

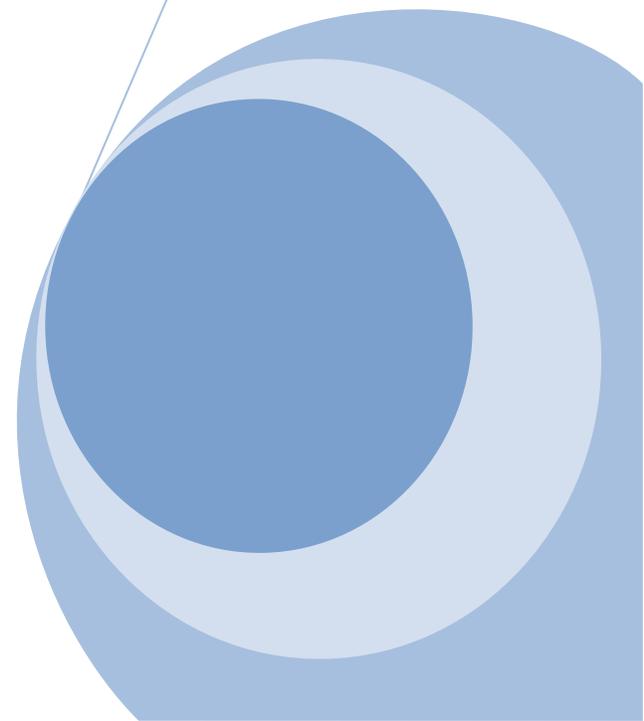
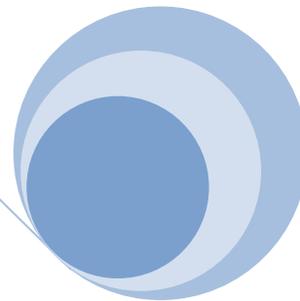
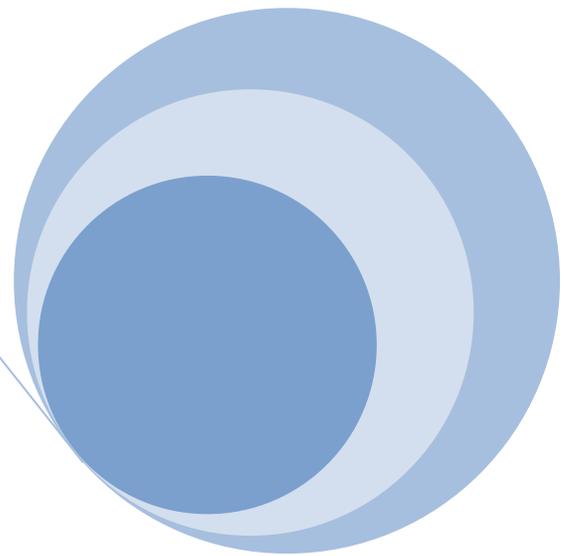
**Supervisor**  
**Prof. DR. Johan Woltjer**

# **Master thesis**

**ANALYZING ECOSYSTEM SERVICE IN COASTAL  
SPATIAL PLANNING BASED ON THE  
INSTITUTIONAL DESIGN**

**ARIF FAJAR ALFALAQY**

**S 2496305**



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**Abstract**

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Ecosystem Services is already being recognized as an important factor to sustainability of human wellbeing. The need of Ecosystem Service is increasing every year because of human activities around the world that have great impact on the depletion of the ecosystem resources. This led to attention for ecosystem services increasingly growing fast among scholar and other institution. Millennium Ecosystem assessment already provide basic information for evaluation and assessment in ecosystem services. The main issue now is that there is the lack of understanding in how to use ecosystem services in spatial planning. There is a need for intervention, but knowing the timing and understanding how to intervene require substantial understanding in both policy and Ecosystems Services. Effective evaluation should be conducted in cross scale and multidimensional interactions. Implementation gap of ecosystem service in practice can be described by using institutional design tools in different level to achieve better implementation in the future. Case study is conducted in Jakarta, the capital city of Indonesia. This study gives description of how ecosystem services are being addressed in coastal spatial planning and what kind of institutional design tools are being recognized in the documents. Research finding describe variety of tools that can be combine in different levels of institutional design to achieve optimal use and protection for ecosystem service. Alternative framework base on Jakarta spatial Planning is also provided in this research to describe ecosystem service in different level of institutional design.

**Key words:** Ecosystem Services, Spatial planning, Institutional Design, Tools, Implementation Gap, Coastal zone

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## I.1 Introduction

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Coastal Ecosystem tend to be vulnerable but also very important to the community because Healthy coastal wetlands provide a buffer against the impacts of climate change, rising of sea level and the safety of people living in low-lying areas (Linden and Voogd, 2004). Within its ecological benefit, coastal zones also provide ecosystem services to the human being such as space, food, water, natural resources, energy and recreation. More than half of the people in the world are living in the coastal zone and dependent to this ecosystem service. Human needs to ecosystem service such as food and water is increasing every year along with the damage to the environmental that cause by human action to meet their demands. According to MA (Millennium Ecosystem Assessments, 2005), the need of Ecosystem Service increasing every year, therefore forces many government around the world to make "trade-offs" among the services. An Institutional arrangement has been made by many countries to fulfill this demand, some country increasing food supply by converting a forest to make space for agriculture. However there are side effect in doing so, by reducing the other function of ecosystem service that may be have equal or greater importance, such as clean water, and ecotourism. Cutting down a rain forest could remove another function like water retention and cause natural disaster like floods. Weak understanding in decision making often cause this problem, decision being made for the good of human well being and economic reason to change the Ecosystem service without actually being realize that many ecosystem service are irreplaceable.

Coastal Problem occurs without Proper Understanding of Ecosystem Service and its function related to human needs. Due to the population growth in order to fulfill human needs, over extraction of coastal resources with various interests is increasing and endangering the sustainable use of coastal zone. This situation tends to create ecological damage in coastal ecosystem which can create a disaster for human being. Degradation in ecosystems affects humans as well as other species. The Coastal management needs to set objectives for the ecosystems because the actions that they take are influenced not just by the consequences of ecosystem changes for humans but also by the importance place on considerations of the intrinsic value of species and ecosystems. Many countries have to create policy to protect endangered species based on the view that these species have a right to exist, even if their protection results in reducing economic benefit. Sound ecosystem management thus involves steps to address Lack of awareness of people to ecosystems service as well as processes that allow

considerations of the intrinsic value of ecosystems service to be factored into decision-making. MA (2005)

Coastal zones Ecosystem provides a wide range of economic, social and environmental benefits, Development in of coastal land use should not only base by economic sector, which is important to be arranged and institutionalized base on Ecosystem Service. Multiple aspects need to be linked together. Knowledge Transfer from variety discipline will be required to linked from conceptual frameworks and theory to practical integration of ecosystem services into policy, in a way that is credible, replicable, scalable, and sustainable.

### **The Millennium Ecosystem Assessment (MA) Program**

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Policy intervention with good understanding of ecological and social system is needed. The Millennium Ecosystem Assessments provide some insight information that can help to improve ecosystem and enhance it contribution to human being. United Nations Secretary- General Kofi Annan stated that:

"It is impossible to devise effective environmental policy unless it is based on sound scientific information. While major advances in data collection have been made in many areas, large gaps in our knowledge remain. In particular, there has never been a comprehensive global assessment of the world's major ecosystems. The planned Millennium Ecosystem Assessment, a major international collaborative effort to map the health of our planet, is a response to this need"

(Millennium Ecosystem Assessments, 2005,p.1)

According to The MA (2005) human wellbeing is their central focus of assessment, arguing that human well-being associated with the provision of ecosystem services is determined by a number of constituents which are: Security related to Provisioning of Goods and Foods; Basic materials for a viable livelihood; Freedom and choice; Good health; and Good social-cultural relations. (Maynard, et al 2010) The assessment deals with the full range of ecosystems—from those relatively undisturbed, such as natural forests, to landscapes with mixed patterns of human use and ecosystems intensively managed and modified by humans, such as agricultural land and urban areas. While recognizing that biodiversity and ecosystems also have intrinsic value and that people take decisions concerning ecosystems based on considerations of well-being as well as intrinsic value.

The main issue now is the lack of understanding in how to use ecosystem services in spatial planning. How Ecosystem service can be use as tool in the Spatial planning. Much research has been done to classify the ecosystem services and its function. De Groot (2002) presents a conceptual framework and typology for describing, classifying and valuing ecosystem functions, goods and services in a clear and consistent manner. While other try to identify the benefits provided by Ecosystem Services to improve social, economic and environmental considerations within strategic decision-making (Pittok et al. 2012). At the same time, the new institutional landscape may provide an unprecedented opportunity for information concerning ecosystems to make a major transformation. Improvements in ecosystem management to enhance human well-being will require new institutional and policy arrangements (MA,2005) and still relation between this concept in Policy tool remain unclear.

## I.2 Problem Definition

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The importance of **Ecosystem service** is not yet being realized in the coastal spatial and strategic planning of many countries. It is really ironic because every aspect of human well being is strongly linked with the provision of Ecosystem Service in coastal zone. Coastal Ecosystem provides variation of different resources and functions that is highly important to the sustainability of human well being. Institutional Arrangements and Management Intervention sometimes can reverse the ecosystem degradation and enhance its function to human well being.

There is a need for intervention, but knowing the timing and understand how to intervene require substantial understanding in both policy and Ecosystems Service. Although better informed cannot guarantee a good policy but it's a prerequisite for better decision making. Many studies have been done in field of Ecosystem Service and Institutional Design, the MA has provided a conceptual framework to assessing ecosystem service and its contribution to human well being. The framework has been used in many countries for creating better understanding in many government and institution of Ecosystem service. While Institutional design can be define as devising and realization of rules and organizational structure to enable constrain behaviour and action, together synchronized with common value to achieve desired objective, (Alexander, 2005). This definition encompasses all activity at all levels of social deliberation and action, including legislation, policymaking, planning and program design and implementation. What left to do is to make an operationalization concept from Ecosystem Service into a

tool that can be used in policy or plan in the coastal management and how it will be implemented in planning practice. Clarify the linkage from concept into policy based on continuous learning process and start implementation on planning practice evident to better informed decision making.

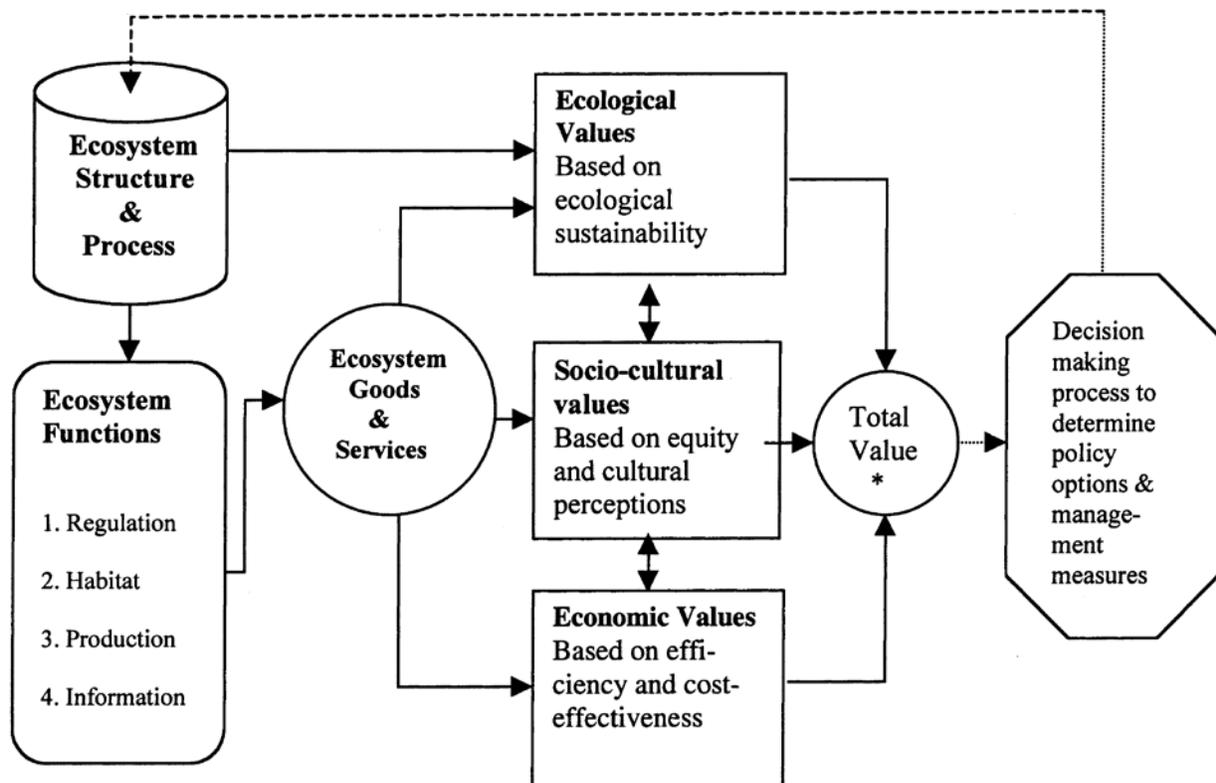


Figure 1 Source : De Groot (2002)

Despite the importance to enhance policy and institutional arrangement to have better understanding with Ecosystem Service approach and to Find a balance between policy and the ecosystem service, still many challenge left in MA to clarify the link from Ecosystem Service and how to combine together economic, social and environment into better decision making. This thesis will try to give attention to the Ecosystem Service in coastal spatial planning and how it can contribute developing institutional arrangement in the future that lead into sustainable and multi-functional coastal management.

### **I.3. Research objective and Expected outcomes**

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The aim of this research is to integrate institutional arrangements and Ecosystem Service within Coastal Spatial Plan. This research will try to explain how addressing institutional design in ecosystem service (on three levels, namely macro-level, meso-level and micro-level) can contribute to develop environmental policy especially in coastal area. This paper will give attention in the implementation of ecosystem services into policy. Environmental degradation occurs without proper understanding in landscape management and ecosystem service inside the environment. Over extraction and destruction of ecosystem resource mostly happen in many places. Development in land use should not only base by economic sector. Land Use planning and policy base on Ecosystem Service can offer alternative to sustainable development and as a way to improve spatial quality. Ecosystem service proven provide a wide range of economic, social and environmental benefits that can be address and integrated using this framework. Even though There are implementation gap between the framework and policy in Ecosystem service, nevertheless according to (Selman, 2010) better policy, better understanding and better landscape Planning will achieve sustainability in Ecosystem and enhance the quality of life in human being.

### **I.4 Research approach and questions addressed**

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According to Linden in (Linden and Voogd, 2004), the vulnerability of coastal ecosystems is one of the main problems facing integrated coastal zone management. This is why most ICZM projects are based on an ecosystem approach. Coastal activities, such as industry, ports, dredging, tourism, agriculture, and civil-engineering artefacts such as hard sea defences can have a detrimental impact on these ecosystems by causing pollution, influencing existing sediment flows, etc. This means that activities in and around coastal areas can inflict damage on the estuarine and sea areas, thereby causing the degradation of existing ecosystems. The importance of these ecosystems has led to the recognition of the need for an ecosystem approach to the management and planning of coastal zones.

The main goal of this research is to see whether there is ecosystem service in the Coastal Spatial Planning and identified it and to come with the idea how Ecosystem Approach can be integrated into the Spatial Plan. Base on this idea the research question of this study are:

## ***How to Captured Possible Institutional Design in the ecosystem services within Coastal Spatial Planning***

the questions this research will be answering are:

1. What can be understood from Ecosystem service and Institutional Design
2. Are the current policy of coastal management consist of Ecosystem Service
3. How to include the Ecosystem Service into the Policy or Institutional arrangements in Coastal Planning.

the step to be taken in order to answer to these question :

1. Identify possible tool of Ecosystem Service in Coastal Planning
2. Identify current institutional arrangement and ecosystem service in Jakarta coastal area;
3. Collecting together all the tool in the matrix and try to make suggestion out of it in the case study.

### *Chapter 1*

- Introduction
- Research Objective and Research Question
- Overview of chapters
- Methodology

### *Chapter 2*

Theoretical framework:

*What are ecosystem Services?*

- What is the Definition of Ecosystem Services?
- How can we understand ES?
- What are the benefits of ecosystem services?

*What are institutional Design?*

- What can be understand from Institutional Design

*Linking Institutional Design with Ecosystem Service*

- What are possible tools in institutional design for implementing Ecosystem services in Spatial Planning?

### *Chapter 3*

Empirical Methodology

-Case-study research

- Policy analysis :

General Plan : Law of the republic of Indonesia number 26 year 2007 concerning National Spatial Plan, Law number 27 year 2007 Concerning Coastal Management and Development, and Law number 1/2014 Concerning revision of law number 27/2007

Specific Plan : Provincial Act 1/2012 concerning Jakarta Spatial Planning

- Qualitative research with coding and content analysis

#### Chapter 4

Finding, Analysis and Discussion

- How can we determine tools for the implementation of ecosystem services in policy?

- Analysis of the case studies: Jakarta

- How ecosystem services are addressed in current policy documents?

- What tools are mentioned in the policy documents?

- How can an attempt be made to implement ecosystem services with the available tools?

- What Institutional design can be found in Jakarta?

#### Chapter 5

Conclusions and recommendations:

- What can we conclude from the implementation of ecosystem services in spatial Planning?

- What recommendations can be made in order to improve institutional arrangement?

Research Question	Objective	Data Required	Methodology
Theoretical Perspective			
What Can be Understand from Ecosystem service	Seek for Understanding in ES approach	Scientific literature	Literature Review
What can be Understand from Institutional Design	Seek for Understanding in Institutional Design	Scientific literature	Literature Review
What are Possible tool for	Seek tool from ID and ES,	Scientific literature	Literature Review

Coastal spatial Planning

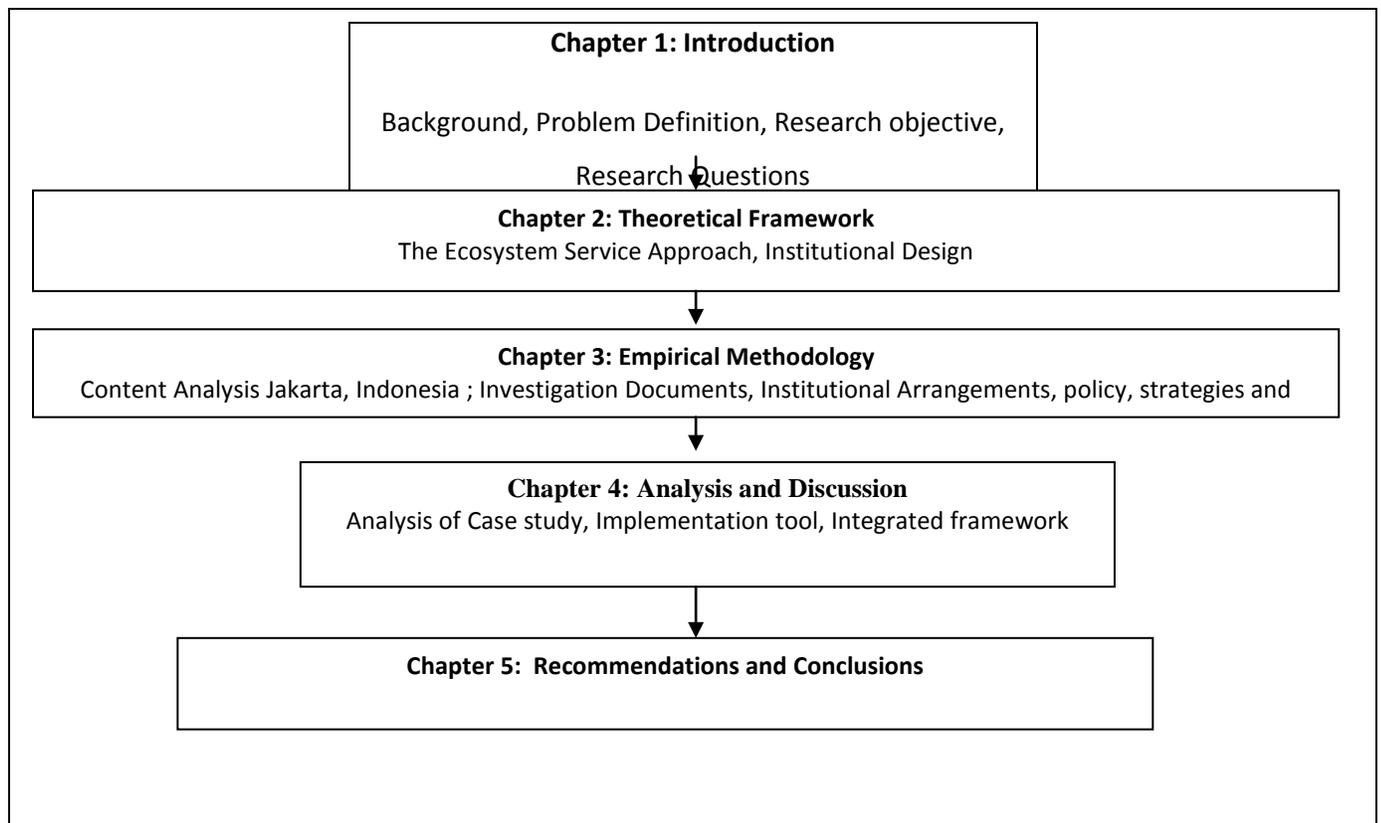
Establish Framework

Empirical Perspective

How we integrate Institutional Design and ES in Coastal Planning  Analysis Indonesia/Jakarta Case	Create Framework	Scientific literature	Literature Review
	Understand the context	Policy Document	Content analysis
	Identify existing tool		
What recommendation and conclusions can we give	Summarize the case	Scientific literature	Literature Review
	Give recommendation	Policy Document	Content analysis

Table 1 Methodological Framework

### The Logical Framework



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## II. Literature Review and Theoretical framework

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This chapter will contain literature and theoretical knowledge that will be use as a guide to and frame this research. Some of the key concept will be explained here to find some clarity and linkage with relevant literature. This chapter will describe the Ecosystem Service and the Institutional Design in general, also will address the link between ecosystem service and institutional design as a strategy toward coastal resilience.

### II.1.1 Coastal Ecosystem

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The MA also already makes boundaries and classification of the reporting system. There are 10 type of ecosystem categories: marine, coastal, inland water, forest, dry land, island, mountain, polar, cultivated and urban. The definition **Coastal** are an area between 50 meters below mean sea level and 50 meters above the high tide level or extending landward to a distance 100 kilometres from shore, "Interface between ocean and land, extending seawards to about the middle of the continental shelf and inland to include all areas strongly influenced by the proximity to the ocean" (MA, 2005,p.10)

According to Burbridge (1997), the main issue in coastal management is how to achieve sustainable use of Ecosystem Resource in coastal zone in the face of Economic interest and inadequate administrative and legislative frameworks. Primary challenge we face is developing institutional framework to improve the process of planning and implementing coastal management base on carrying capacity of ecosystem. Opportunities for developing Legal and Administrative are greater now after recent agenda in coastal ecosystem (UNCED with agenda 21 chapter 17 and MA). Nevertheless the implementation of sustainable use of coastal ecosystem is still facing many obstacles. It must be recognize that there are still lacks of people who can understand how to plan and manage the sustainable human use of coastal ecosystem. Institutional Design could improve the process of planning and increasing awareness of decision makers, planner and society by achieving a shifting from controlling the end use of coastal ecosystem development into a shift toward a more balance approach, where development of coastal zone are also consider the carrying capacity of ecosystem service so that they could continue to be productive while sustain different form of activity.

Ecosystem service also can be use as a tool to answer the question how we measured environmental quality, and in the way we could do it sustainable. The key how to make it sustainable here is to integrated Environmental and social issue in ecosystem service into policy. The recognition of

the environmental issue only without clear implementation will not enough to achieved environmental objectives in coastal planning. One of the primary challenges is that many Ecosystem Services are public goods or attached with community sense of belonging, therefore the use levels are difficult to regulate, even when the resource is reaching the point of depletion. Even though human being benefit from ecosystem service, usually individual or groups don't have sufficient incentives and capacity to maintain sustainable use of Ecosystem service. For example, free access to coastal fisheries could give valuable provision on human but on the other side could accelerate fisheries depletion and future food. (Fisher, 2009)(Daily, 2009)

## II.2.Ecosystem Service

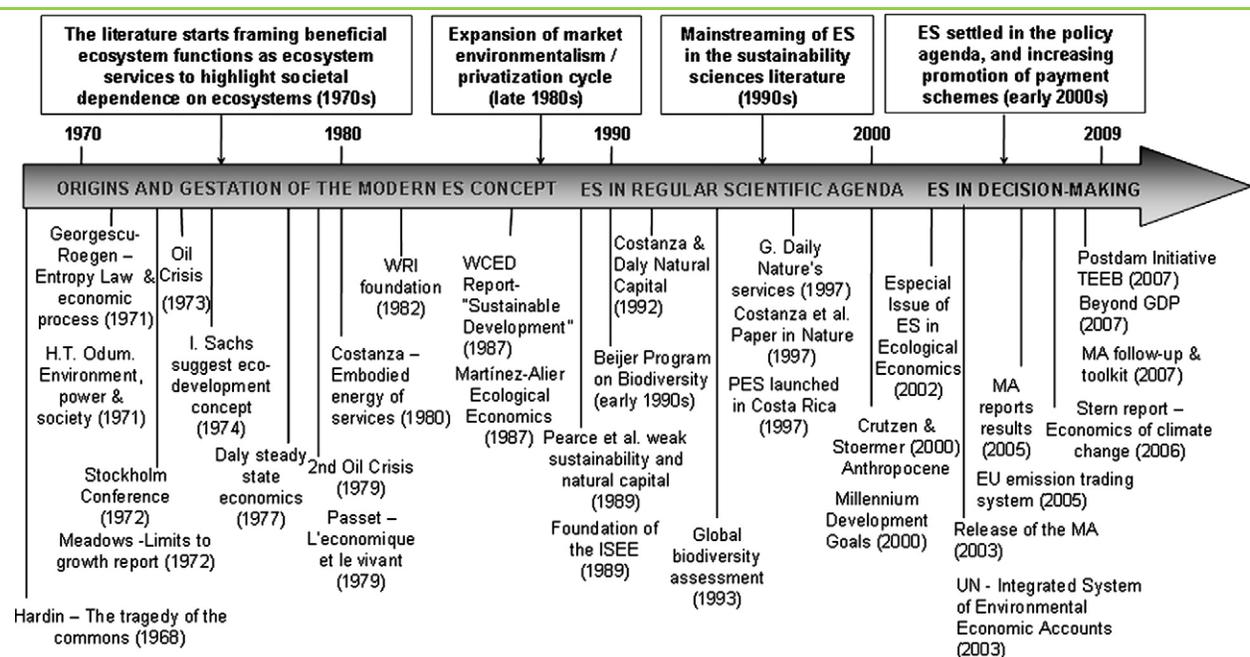


figure 2 Source : Gómez-Baggethun, Erik, et al (2010)

The notion of ecosystem service already being mention by many authors, the common understanding is the service that being provide by nature (actively or passively) for the good of human well being either directly or indirectly (Fisher, 2009). Another definition is related to the benefit that human being can obtain from the ecosystem function (Costanza et al., 1997). Although there are many definition of ecosystem service, it is important to seek for clarity of this; a clear and functional definition will allow meaningful comparison of different project and policy. Clear definition will give us boundaries, and frame according to the context we need and to help classifying it. (Fisher, 2009).

MA (Millennium Assessment for Ecosystem) has offered general definition that can use in this research, the definition of Ecosystem service is the benefit that human being can derive from ecosystem

and being classified into four services categories. There are supporting service that being needed by all other service because produce oxygen, such as: soil formation and nutrient cycling; provisioning service such as food and water; regulating service such as floods regulation, drought regulation, and land degradation ; and cultural service such as recreational, spiritual and educational. Other definition come from different author can be mention:

- Ecosystem services are the aspects of ecosystems utilized (actively or passively) to produce human well-being. (Fisher et al., 2009)
- Ecosystem services are the benefits human populations derive, directly or indirectly, from ecosystem functions – (Constanza et al., 1997)
- Ecosystem services are components of nature, directly enjoyed, consumed or used to yield human well-being. (Boyd and Banzhaf, 2007)
- “Ecosystem services are the conditions and processes through which natural ecosystems, and the species that make them up, sustain and fulfill human life (Daily, 1997)
- Ecosystem services are the benefits people obtain from ecosystems (WRI, 2005)
- Ecosystem services are the direct and indirect contributions of ecosystems to human well-being. (TEEB Foundations, 2010)” (De Groot, 2012)

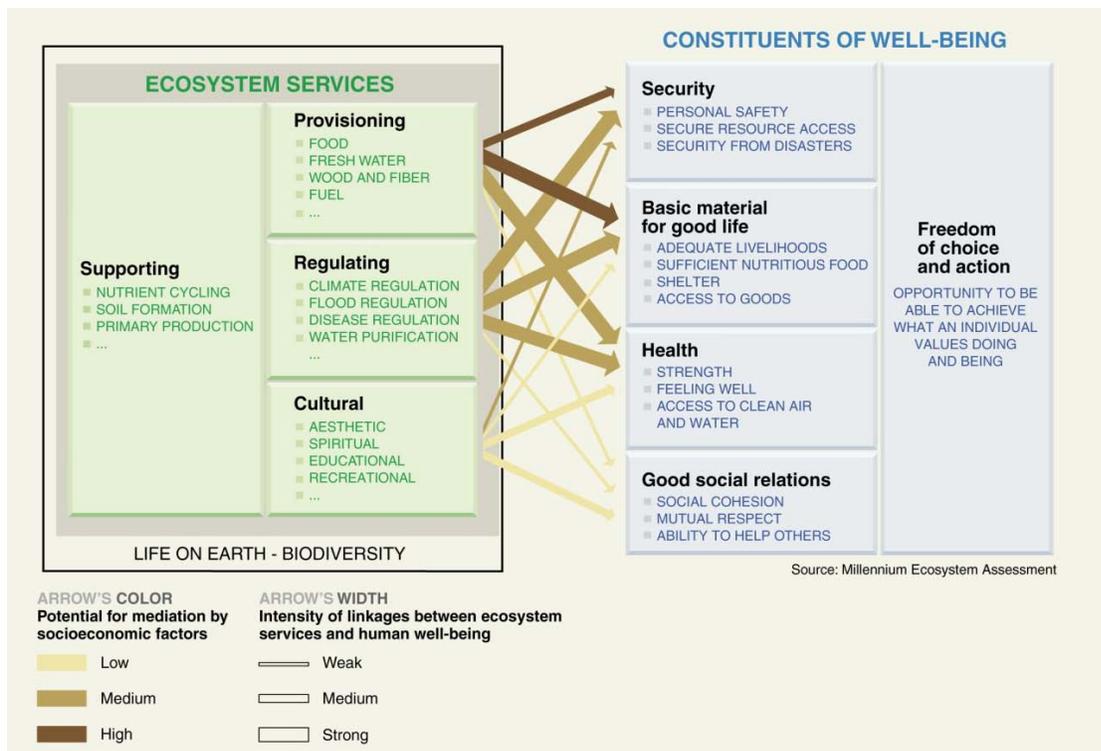


Figure 3 : Linkages between Ecosystem Service and Human Well-being MA, (2005)

### **II.2.1. Provisioning Services**

Provisioning services are products of natural resources which can be seen as the supply of goods that provide direct benefit such as food, fuel, fibre, fresh water, and genetic resources to people. Coastal ecosystem provides products such as the following:

- Fisheries and other coastal organism that can be utilized for human consumptions;
- Another Biodiversity organism for a variety of different uses, for example, seaweed for industry and fertilizer, fishmeal for aquaculture and farming, and pharmaceuticals.

According to (Karrasch et al, 2014) the provisioning of ecosystem services build a basis for the regional economy, especially characterized by the provision of products. However Coastal Land uses Pressure often because overexploitation and virtual elimination of fish stocks, bring about overall decrease in biodiversity. Institutional Intervention in this category has to able to support the balance Between the strong supply directed needs and preserve biodiversity.

### **II.2.2. Regulating Services**

Regulating services consist of many functions carried out by ecosystems which are often give great benefit to human well being. This function give protection regulation such as gas and climate through the storing of carbon and control of local rainfall; the removal of pollutants by filtering the air and water; and protection from disasters such as landslides and coastal storms. Living marine flora and fauna can play a valuable role in the defence of coastal regions. The presence of organisms and species in the front line of sea defence can prevent and weaken the impact of tidal surges, storms and floods. These species like mangrove forests and sea grass beds are proven to give natural protection to the coastal.

### **II.2.3. Cultural Services**

Cultural services are the nonmaterial benefits that can be obtain from ecosystems contributing to wider needs and desires of society also multiple cultural identities of a community, which including the spiritual value attached to particular ecosystems such as iconic groves, and the panoramic beauty of landscapes or coastal signature that give attraction for tourist. Coastal Ecosystem can provide the basis for a wide range of recreational activities for human well being: (sea) bird watching, rock climbing, beach gathering, fishing, recreational diving, and water sport. (Beaumont, N. J., et al, 2007). The Cultural service in coastal can be conclude also have significant results in employment opportunities.

### **II.2.4. Supporting/Habitat Services**

Supporting services are those that are necessary for the production of all other ecosystem services, but important to the functioning of ecosystems and therefore indirectly responsible for all other services. However, these services do not give direct benefits to humans. Examples of this type of service are: production of oxygen, and soil formation. According to (Beaumont, N. J., et al., 2007) Many coastal organisms provide living habitat through their normal growth, for example, meadow forming sea grass beds, mangrove and marine algae forests. These 'natural' habitats can provide an essential place for breeding and nursery, this could be important for the continued recruitment of commercial and/or subsistence species. This habitat can provide a 'home' for plants and animals including surfaces for feeding and hiding places from predators. These living habitats play a critical role in species interactions and regulation of population dynamics, and are a pre-requisite for the provision of many goods and services. This service is rather difficult to be assessed without relating it with other services.

	<b>Main service types</b>
	<b>PROVISIONING SERVICES</b>
1	Food (e.g. fish, game, fruit)
2	Water (e.g. for drinking, irrigation, cooling)
3	Raw Materials (e.g. fiber, timber, fuel wood, fodder, fertilizer)
4	Genetic resources (e.g. for crop-improvement and medicinal purposes)
5	Medicinal resources (e.g. biochemical products, models & test-organisms)
6	Ornamental resources (e.g. artisan work, decorative plants, pet animals, fashion)
	<b>REGULATING SERVICES</b>
7	Air quality regulation (e.g. capturing (fine)dust, chemicals, etc)
8	Climate regulation (incl. C-sequestration, influence of vegetation on rainfall, etc.)
9	Moderation of extreme events (eg. storm protection and flood prevention)
10	Regulation of water flows (e.g. natural drainage, irrigation and drought prevention)
11	Waste treatment (especially water purification)
12	Erosion prevention
13	Maintenance of soil fertility (incl. soil formation)
14	Pollination
15	Biological control (e.g. seed dispersal, pest and disease control)
	<b>HABITAT SERVICES</b>
16	Maintenance of life cycles of migratory species (incl. nursery service)
17	Maintenance of genetic diversity (especially in gene pool protection)
	<b>CULTURAL &amp; AMENITY SERVICES</b>
18	Aesthetic information
19	Opportunities for recreation & tourism
20	Inspiration for culture, art and design
21	Spiritual experience
22	Information for cognitive development

Table 2 typologi of Ecosystem service in TEEB, (Kumar,2010)

Ecosystem services can be defined as ‘benefits people obtain from ecosystems’ (MA 2005, p. 53). Protection and conservation of ecosystem service is the main objective of ecosystem approach. Recognizing Ecosystem Service component are important to enhance their productivity and sustainable use of its service. (MA, 2005). Ecosystem service component have been recognized from (MA, 2005) and De Groot (2002) into 4 groups of category (table 3):

1. Provisioning Service (P) : service come from natural resource and product that can be produce by ecosystem.
2. Regulating Service (R) : Benefit that can be obtain from the regulation of ecosystem service and protecting life support systems
3. Cultural Service (C) : cultural service can be seen as non material benefit people obtain from ecosystem, that can give cognitive development through exposure of life processes and provide life fulfilment opportunities.
4. Supporting service (S) : Provide habitat or indirect service for bio diversity of species at multilevel scale that are necessary for all ecosystem service.

Ecosystem Service	Constituent of wellbeing
Gas Regulation (R)	Breathing (E)
Climate Regulation (R)	Drinking (E)
Disturbance Regulation (R)	Nutrition (E)
Water Regulation (R)	Shelter (E)
Soil Retention (R)	Physical Health (H)
Nutrient Regulation (R)	Mental Health (H)
Waste Treatment and Assimilation (R)	Secure and Continuous Supply of Services (S)
Pollination (R)	Security of Person (S)
Biological Control (R)	Security of Health (S)
Barrier Effect of Vegetation (R)	Secure Access to Services (S)
Soil Formation (R)	Security of Property (S)
Supporting Habitats (S)	Family Cohesion (GSR)
Food (P)	Community and Social Cohesion (GSR)
Raw Materials (P)	Social and Economic Freedom (FCA)
Water Supply (P)	Self-Actualisation (FCA)
Genetic Resources (P)	
Provision of Shade and Shelter (P)	
Pharmacological Resources (P)	
Landscape Opportunity (C)	
Food (P)	
Water for Consumption (P)	
Building and Fibre (P)	
Fuel (P)	
Genetic Resources (P)	
Biochemicals, medicines and pharmaceuticals (P)	
Ornamental Resources (P)	
Transport Infrastructure (P)	

Air Quality (R)  
 Habitable Climate (R)  
 Water Quality (R)  
 Arable Land (R)  
 Buffering Against Extremes (R)  
 Pollination (R)  
 Reduce Pests and Diseases (R)  
 Productive Soils (R)  
 Noise Abatement (R)  
 Iconic Species (C)  
 Cultural Diversity (C)  
 Spiritual and Religious Values (C)  
 Knowledge Systems (C)  
 Inspiration (C)  
 Aesthetic Values (C)  
 Affect on Social Interactions (C)  
 Sense of Place (C)  
 Iconic Landscapes (C)  
 Recreational Opportunities (C)  
 Therapeutic Landscapes (C)

Table 3 : Components for Addressing ESS in Policy (Ecosystem Services, and Constituents of Well-being)  
 (modified from Maynard, 2010)

## II.2 Institutional Design

Policies and plan came with reorganization or require new organization need institutional design to see how they will be implemented. Institutional design also needed in the implementation that involves regulation and legislation in policy making. (Alexander, 2012). Before defining what is institutional Design in general, we will define what is Institution first, according to (North, 1990) we can see Institution are set of rules in society that constraint the human interaction with complexes norm to served with collectively valued purpose and some of it have an organizational form.

Institutional Design can be defined as "designing institutions : devising and realizing rules, procedure and organizational structure to enable and constrain behaviour and action and conform them to held values, achieve desired objectives or execute given tasks" (Alexander, 2006:4). Base on this definition we can conclude that Putting policies, plan and program into effect can be seen as institutional design. (Alexander, 2012).

There are three level where Institutional design can be distinguish: macro level, meso level, and micro level. Most of the planning study are focusing on the meso level, where planning take place with implementation of process and structures such as creating new organization; establishing law, regulation, and resource to create policies, project and plans. Example field of practice of this level are:

land use planning, infrastructure and transportation planning, housing and environmental policy (Alexander, 2012)

### **II.2.1 Institutional Design in Macro Level**

The highest 'level' institutional design is applied to whole societies which addresses macro-societal processes and institutions. Institutional design is often mistakenly identified and limited at this scale of level. The drafting and adoption of national constitutions is one of these kinds of institutional design. The institutionalization of societal norms in new forms of law and legal processes is another form of institutional design at this level (Alexander, 2006). range of institutional contexts related to coastal ecosystem are : Global scale initiatives and regulation to control of greenhouse gas emissions ; also Formulation and implementation of State policies and regulations for specific ecosystems and environments (e.g. biodiversity, wetlands, native vegetation, water quality, air quality, waste management) to achieved coastal protection. (Maynard, 2010)

### **II.2.2 Institutional Design in Meso Level**

This Scale involves the institutional design of planning and implementation structures and processes and where usually planners get involved. Meso level consist activity in the creation or utilization of inter-organizational networks, the establishment of new organisations or the transformation of existing ones and devising and deploying incentives and constraints in the form of laws, regulations and resources to develop and implement policies, programmes, projects and plans. Examples of Institutional Context in this level are: public–private partnerships for coastal Development, Coastal Revitalization Program and Protection, new towns and planned community development in coastal area, river basin management authorities, and planning and implementing major strategic projects.

### **II.2.3 Institutional Design in Micro Level**

The lowest 'level' of institutional design involves intra-organizational design, where activity is take place within the organization. According to (Alexander, 2006) activity take place in this level consist organizational sub units and small semi-formal or informal social units – groups and group processes and interactions, like committees, teams, task forces, work groups that intend to achieve task performance effectively and efficiency. This kind of institutional design is involved in establishing and managing planning processes and policy, plan or project implementation. Examples of Institutional Context in this

level are: planning agency's participatory structure of citizen and technical advisory committees for developing Coastal Recreation Place for tourist. New experimental Project, different monitoring for organization or different way to work is typical institutional design at this level.

### II.3 Linking Institutional Design with Ecosystem Service

Coastal Ecosystem is continuously changing through human intervention. Many of original ecosystems have been converted to another form of landscape that can be seen by its characteristics and land use management. According to European Landscape Convention (ELC) (Council of Europe, 2000) landscape has definition as an "area perceived by people, whose character is the result of the action and interaction of natural and/or human factors"; while landscape planning is "strong forward-looking action to enhance, restore or create landscapes". Regard in its definition landscape planning has important role within sustainable agenda (Selman, 2010). Landscape planning in the policy level is the centre of action to deliver environmental objective and supporting Ecosystem service.

Management of coastal ecosystem are different among each service. They differ in how goods being extract production level of its service, and biodiversity quality. Change in land use management will give significant impact to these system, process, and service provision. Therefore a small change in land use will modify service supply not only for that specific area but also for the whole service production in that ecosystem. (De Groot, 2010b). More over De Groot (2010b), also mention in order to make better policy regarding land use trade-offs, a iterative process of the ecosystem management and ecosystem service relationship is needed (figure 4).

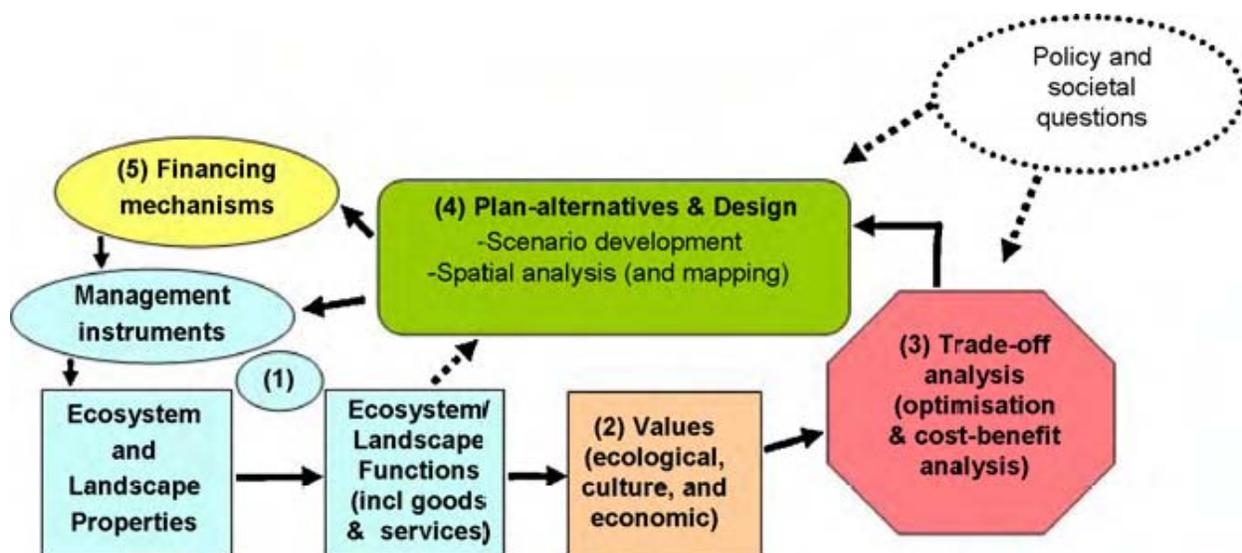


Figure 4 : De Groot(2010b) Framework for integrated assessment of ecosystem and landscape services

### II.3.1 Possible tool in Ecosystem Service

Ecosystem Service can be defined as benefit that human obtain from environment and being classified into four services categories, There are supporting service that being needed by all other service because produce oxygen, such as: soil formation and nutrient cycling; provisioning service such as food and water; regulating service such as floods regulation, drought regulation, and land degradation; Cultural service such as recreational, spiritual and educational (MA (2005). Ecosystem function can be define as the “capacity of ecosystems to provide goods and services that satisfy human needs, directly and indirectly” (De Groot, 1992, 2010b, p .262). Some of This capacity can be measured in economic and monetary term while others not. (De Groot(2010). Nevertheless relationship between physical and spatial landscape characteristics and the associated functions and services of ecosystem still poorly addressed. There are two important indicators to describe the relationship comprehensively. First is state indicator to describe the amount of component and process being provided by ecosystem and second is performance indicator to describe the amount of service that can be used in a sustainable way. for example, the total average stock of food in certain area can be describe in100 kg/ha while from this amount only 80 kcal /ha/year that can be use without threatening the capacity of this service to regenerate. (De Groot, 2010b).

According to Daily, et al (2009) if we can make individuals and institutions to appreciate the value of nature, then this could increase investments in conservation, while at the same time fostering human well-being. However, current framework is still need to developed for implementation, either the policy and finance mechanisms, for incorporating natural services into resource and land-use planning on a large scale. There are many different way to explain the value of ecosystem service. The most known value domain are ecological, socio cultural and economic (MA, 2003). The ecological value incorporating the healthy state of ecosystem and can be measured with indicator of diversity and integrity. Socio cultural value incorporate everything that the society giving meaning in ecosystem, for example: cultural identity that is related to their ecosystem service (De Groot, 2010b). The economic value has two different kinds of values: use values and non use values. Use value incorporate direct consumptive, direct non consumptive and indirect use of resource in ecosystem. Examples of direct consumptive use are: fish, wood, oil while for direct non consumptive are related to recreation and aesthetic function. Indirect use can be seen in air and water purification, or protection forms in nature, example form in coastal zone are: salt marsh provide protection against salt water intrusion. Other economic value are Non use value, it can be describe as the attributed value to an environmental aspect

(existence values). Total Economic Value (TEV) is tool to refer the total aggregate of use and non use values associated to resource of ecosystem service. Monetary term is usually being used to measured economic values; nevertheless there are tendency to translate socio cultural and ecology into monetary values. Market prices can be used for many ecosystem services especially for provisioning services such as coastal fisheries and forest product. Market prices also can be applied to other ecosystem service in an indirect way to measured it, for example, damage cost method for regulating service, and hedonic pricing and travel cost method for cultural service and recreational place. Contingent valuation with questionnaires also can be used to measured people preference (De Groot, 2010a).

### **II.3.2 Financing tool advantage and drawbacks**

One of the issue in management and governance of ecosystems are poor information and institutional incapacities. There are some case where lack of knowledge is occurs, less people understand contribution of ecosystem service and biodiversity to human well being, and how human action could create negative environmental impact. In other cases, institutions are proven to provide bad policies and the wrong incentives. These kind of mistake and the complex relations between ecology and economy often lead to natural degradation and accelerating depletion of ecosystem service. To overcome these situations, it's important to address the value of ecosystem service into societal decision making. Finance Mechanism for ecosystem services have become an increasingly popular approach to dealing with environmental problems around the world. (Kemkes, 2010). Some stakeholder managing ecosystem usually only get benefit from part of the ecosystem service but their activity affecting the whole ecosystem. For example over extraction in some part of coastal zone create sedimentation and increasing flood risk for the whole settlements. In reaction to these case, there is economic rationale for setting up payment mechanisms from stakeholders. Stakeholders will carrying the (opportunity) costs of managing or maintaining an ecosystem, in the form of payment for ecosystem services (PES) projects that can be applied in different scale (De Groot, 2010b). Some important factor in designing a payment program, policymaker should first determine whether the ecosystem service is a public good, market good, toll good, common pool resource or inefficient market good. After that policy maker should identify the spatial scale at which the benefits accrue. These methods will help determine if payments will be efficient, effective and politically feasible and what institutions are required to create monopsony power. (Kemkes, 2010). Penalties, taxes and charges, are practical and efficient mechanism for eliciting land management practices that provide ecosystem services, in some case this could be applied for industrial polluter however it may not be equitable for private landowner. Table 3 provide

some example of economic and non economic tool to value bio diversity, however economic tool is not our focus in this thesis.

**Economic and non-economic techniques available to value biodiversity.**

Economic techniques	Non-economic techniques
Market price approaches	Consultative methods:
Market cost approaches	Questionnaires
Replacement costs approaches	In-depth interviews
Damage cost avoided approaches	Deliberative and participatory approaches:
Production function approaches	Focus groups, in-depth groups
Revealed preference methods	Citizen juries
Travel cost method	Health-based valuation approaches
Hedonic pricing method	Q-methodology
Stated preference methods	Delphi surveys
Choice modelling	Rapid rural appraisal
Contingent valuation	Participatory rural appraisal
Participatory approaches to valuation	Participatory action research
Deliberative valuation	Methods for reviewing information:
Mediated modelling	Systematic reviews
Benefits transfer	

Source: Christie et al. (2008).

Table 3 : Economic and non Economic technique to value biodiversity (Christie et al. (2008) taken from De Groot (2010b)

### II.3.3 Ecosystem services to improve analysis and decision making

Decisions making at any level (private, corporate or government), are faced with the dilemma of how to keep the balance (weight) between ecological, socio-cultural and economic values. Because not all aspect can be translate into monetary terms, Ideally each of these value-components should be weighted on its own (qualitative and quantitative) dimension with applicable tool, e.g. through Multi-Criteria Decision Analysis (De Groot, 2010). Trade off occur when extraction of some or certain ecosystem service causing negative influence to another provision of ecosystem service. For example, over extraction and land use change in coastal zone could affect other bio diversity and function of coastal zone (e.g. water quality, recreation, carbon sequestration) that at certain point will loss their derived benefits. To assess tradeoffs between economic, ecology and social culture of ecosystem, the total bundle of ecosystem service provided by different conversion and management should be included. Approach that can be use to make comprehensive planning in trade off include: Multi-criteria analysis, Cost Benefit analysis, Cost Effectiveness analysis and Environmental Impact assessment. After the consequence of trade off in ESS is known, then the impact to land use change management can be

analyzed. The analysis should covers both individual and holistic focus on ecosystem impact. Consider that single function of ESS could influence the whole total bundle of ecosystem service and their values at the local, regional and national scale (e.g. food provided by local scale have benefit and impact to higher level). Some instruments are available to analyze implication of land use change such as: mapping and visualizing ecosystems services, modelling changes in ecosystem services. Overall to make well-informed decisions making about trade-offs between different ESS, every drawback and advantage should be taken into account, including ecological, socio-cultural and economic values and perceptions. There are positive results that show when all of these factors all taken into account properly, multi functional sustainable use could give more benefit rather than conversion of single function land use. (Balmford et al., 2002; Turner et al., 2003)

Increasing scientific knowledge and relevant information about ecosystems could reduce uncertainty about resource and land use impacts. From this information Decision makers could design spatial policies and perform an ex ante evaluation of their management strategies in land use within its capacity to provide goods and service. This task tend to be complex consider that most of the ecosystem provide more than one service and lead to varied possible trade-off for policy making. One of the scientific literatures that addresses policy maker is *The Economics of Ecosystems and Biodiversity* (TEEB, 2010), it describe that International and national policies could affect bio diversity and ecosystem sustainable. TEEB also give some policy toolkit for decision makers at multiple scales of governments. Some policy toolkits are: subsidies and incentives, environmental liability, market creation, national income accounting standards, trading rules, reporting requirements, eco-labelling. These policies aim to protect ecosystem and biodiversity while at the same time maintain productivity of their natural resource and service.

Improvement in Coastal Ecosystem Management for the greater good of human well being will need institutional and policy arrangements. Changes to the access of resource and inter organizational collaboration also important to achieve a more sustainable use of ecosystem service. Many Governments already recognize the important of this service as basic life support system and make important effort to secure this service so it can be use until future generation to come. When viewed from institutional perspective, ecosystem management can be seen as an attempt to build and develop institutional ecosystem, which mean the goal of this ecosystem management can be conclude as a way to improve resource management by changing institutional arrangements and improving coordination between the organizations either public, private or Nonprofits' organization in this network. (Imperial,

1999). Maynard (2010) identified a wide range of institutional contexts in which policy and management decisions are made that involve natural resources and ecosystem services. Some of these include:

- Global scale initiatives such as control of greenhouse gas emissions.
- Management of special areas of international and national significance (e.g. World Heritage Areas, Ramsar sites).
- Formulation and implementation of State policies and regulations for specific ecosystems and environments (e.g. biodiversity, wetlands, native vegetation, water quality, air quality, waste management).
- Regional strategic plans.
- Land-use zoning.
- Dedication and management of conservation areas.
- Local environmental plans.
- Integrated catchment management.
- Environmental protection policies, programs and projects.
- Environmental and social impact assessments—development approval processes.
- Incentive systems for environmental protection and/or enhancement.

Another author (Salzman,2005) identifies five types of tools for ESS : prescription, penalty, property rights, persuasion and payment (Salzman, 2005). Policy tool choice for ecosystem service provision should depend on the dimensions of the tool, where the policy is capable in a circumstances or particular context and effective in achieving a particular level of ecosystem service provision. Policy tool choice should also depend on the spatial scale and characteristics or context of the ecosystem service being provided. ( Kemkes, 2010). To create change in decision making, it is important to establish the value of natural capital in institutions (Daily, 2009). Without institutional change, society will continue to carry their harmful behaviors to ecosystem in the long term (e.g. over extraction of fisheries and timber). Even though many Methods are possible, from creating monetary incentives to altering cultural norms, there are no single panacea for initiating institutional change, and it would take some experiment from a different situation and possible mechanism (Ollsson et al.2008). it is important for planner to be linked with relevant stakeholder as well as public and private organizations from the beginning, to design policy and improve its form of implementation while knowledge and understanding increase among them.

Table 4 provide summary of different policy tool according to institutional design level that can be use to analyzing ecosystem service in coastal and land use planning. Three categories can be distinguish following the study literature above. Each of Ecosystem service categories will be examine using institutional design category. Institutional design can be seen as a way to creating or design institution in the form of any social deliberation and action. Thus actions including legislation, policymaking, planning and implementation in that can be divide into macro, meso and micro. The framework in table 5 is divide ecosystem service into four categories in which every category is dividing again into macro, meso and micro. This framework will help to understand how ecosystem service is being use in policy document, how it is mention and organize in the policy and to see either ESS value being address or not in the policy making. To combine ecosystem service with institutional design is also important to see what actor is involved in the document and how they interact among other. The Objective of the policy tool that being mention in the document will also be examine to understand the value of Ecosystem service and how far Ecosystem service is being implemented in the document.

	<b>A. Macro (General Rules)</b>	<b>B. Meso ( Inter-organization)</b>	<b>C. Micro (intra-organization)</b>
	<b>Governance</b>	<b>Coordination</b>	<b>Agency</b>
<b>Ecosystem Service</b>  <b>1. Provision</b>  <b>2. Regulating</b>  <b>3. Cultural</b>  <b>4. Supporting</b>	General Rules applied in all levels, Environmental Law, General Financing rules, General taxation rules , Land Use Zoning (Protection of Provision, Regulating, Cultural, and Supporting Service) for sustainable use  Bio Diversity Mapping (ESS Protection)  Global Scale Initiatives, Agenda 21, MA  Total Economic value, GDP, Human index, Biodiversity Index, Ecosystem Resilience (e.g. air, soil and water quality regulation), Sustainable Value, inter-intra generation fairness and equity  Integrated Environmental, social and Economic Objective, Modelling Change in ES,	Communication and coordination, De-concentration, Conservation and Protected area, Green landscape planning  Privatization, Public Private Partnership, Value Capture, Eco labels, Multi functional Land Use, Informational Campaign, Education, Environmental Policy, Social innovation, Market Prices, Stakeholder participation, Hedonic Pricing, Transaction cost,  Environmental Impact Assessments, Cost Benefit Analysis, Strategic Environmental Assessment, Social Impact Assessment, Sustainable Multi Functional Land use,  Multiple Land use, Value Capture, PPP, Public Campaign, Coastal Revitalization, ICZM, Tran boundary Policy, Education Land endowment, Land Use Moratorium, interactive tool  Property rights, Penalty, Incentives, Tradable Emission, Eco taxes, Local Payment Agreement	Mapping and Visualizing future Impact, Information ,Enhance local Capacity and Participation, insight knowledge, capacity  Awareness, Protecting Local Heritage, increasing Local Economy, social Cohesion, Voluntary Instrument, Local Tourism and Cultural place and identity, Consultative Approach, Deliberative participation  Local Environmental Plans, Local Knowledge and characteristic, Sustainable Local System, institutional support to indigenous people, eco tourism  Good Governances (Transparency, Accountability, Capacity, Participation), Maintain Performance and effectiveness, FGD

Table 4 Ecosystem Service and Policy Instrument

ESS	Stakeholder	Instrument	Objective
1.Provision a. Macro b. Meso c. Micro			
2.Regulating a. Macro b. Meso c. Micro			
3.Cultural a. Macro b. Meso c. Micro			
4.Supporting a. Macro b. Meso c. Micro			

Table 5 Framework for analyzing Ecosystem Service

### III. Methodology

Ecosystem service approach raise important question in how it could be implemented in the policy, in order to answer these questions, case study research is being held. General spatial planning and coastal management planning is being selected and analyze. According to Babbie (2013), case study can be seen as a way to examine and seek understanding in some social phenomenon. The reason to do this case-study research is to collect practical information in how ecosystem service addressed in the policy.

The reason to choose Jakarta and which make it interesting as a case study instead of cities in develop country, because in Jakarta we can see how the institutional arrangements is create to overcome the problem that still happening until today. Literature review in chapter two is already providing a framework to examine policy document. This framework is use to answer the question of what and how ecosystem services are addressed in current policy documents, and in what institutional design are they

being categorized. Practical information in ecosystem service can be gain from this research to improve current institutional arrangement and overcome the problem. Because of limited scope on this research, three policy documents is being analyzed using Atlas Ti.

### III.1 Policy content analysis

Content analysis is study of recorded human communication (Babbie, 2013). Nowadays the most popular forms are book, web page, newspaper and various text. In this research we are using text document or more specific we will analyze policy document. In this case study, policy documents will be analyzed with regard to the cases of Jakarta in planning. Because of limited scope on this research, three policy document is systematically arrange and analyzing using Atlas Ti. Object analysis for this research Are policy document from Indonesia general Spatial Planning (Rencana tata ruang wilayah nasional), Indonesia coastal area management (Pengelolaan Wilayah Pesisir Dan Pulau-Pulau Kecil), and Jakarta General Plan (Rencana tata ruang wilayah Jakarta). The objective of the analysis is to address Ecosystem service in the policy document and to give insight how the Ecosystem service institutionally being arrange in the document. Result analysis will be given as recommendation of how can attempts is made to implement ecosystem services with the available tools. Open perspective of ecosystem service category and description is applied to this research, we are fully aware that some of ecosystem service may not being mention in an explicit form in the document. In order to get more holistic approach, certain degree of interpretation is allowed to some of the code that meet criteria in MA (2005) as 'benefit to human being in Ecosystem'.

### III.2 Qualitative research with Atlas TI

Atlas TI is multifunctional software with powerful tool for qualitative data analysis. It contain variety of tools to manage, extract, compare, explore, and reassemble meaningful pieces from large amounts of data in creative, flexible, yet systematic ways.(Atlas TI manual). The codes, family and description that used in the content analysis will mainly be in forms of words and pieces of texts. The terms 'codes' and 'family', will be based on the ecosystem services and institutional Design characteristic. All codes and their description will be based on the classification of Institutional Design and ecosystem services provided in literature review. First, we will examine the code (pieces of text that match to the criteria) in the whole document, after the code is recognized, it will be interpreted and explained how this ESS can be implemented, how it will works in the current policy and how it can be organized in coastal planning. The goal would be to fill in table 5 as conceptual framework and to see how ESS and Institutional Design are being use.

### III.3 Policy documents

A selection is made of policy documents for the cases of Jakarta, Indonesia divided into two type: general plan and specific plan.

General Plan : Law of the republic of Indonesia number 26 year 2007 concerning National Spatial Plan ; Law number 27 year 2007 Concerning Coastal Management and Development ; and Law number 1/2014 Concerning revision of law number 27/2007

Specific Plan: Provincial Act 1/2012 concerning Jakarta Spatial Planning ;

### III.4 Coding in Content Analysis

Coding can be defined as classification of the material or data that being observed in the document (Babbie, 2013). Moreover coding according to Babbie, (p.325, 2013) is "a process of transforming raw data into a standardized form. In content analysis, communications-oral written or other form of document-are coded or classified according to some conceptual framework". In this research, conceptual framework in chapter 2 is use as a base of analysis within the support of Atlas TI Program to recognize text related to ecosystem service and Institutional Design.

Table 6 ID Coding Framework

Institutional Design	Codes	Description/Specification	Indonesia Translation
1.Macro (Governance)	High Level Government, General Rules	General rules, constitutional law, General taxation, Norm, Standard, legal,	Aturan umum, hukum konstitusi
2. Meso (Inter-organization, Coordination)	Inter-organization, coordination Finance Mechanism	Coordination, Inter organization, new organization, implementation, operationalization, Planning, regulation, finance mechanism, , Communication	Koordinasi, antar organisasi, organisasi baru, implementasi, operasionalisasi, Perencanaan, regulasi, mekanisme keuangan,, Komunikasi
3. Micro (Intra-agency/ agency)	Intra Organization/Agency	Information, Improve, new methods, idea, monitoring system, Capacity building, committee, team, task force, Communication, Effectivity, Performance, task, division,	Informasi, alat, Meningkatkan/peningkatan kinerja, metode baru, ide, sistem pemantauan, Peningkatan kapasitas, panitia, tim, satgas, Komunikasi, Efektivitas, Kinerja, tugas, divisi,

Table 7 ESS Coding Framework

ESS Family	Codes	Description/Specification	Indonesia Translation
1.Provision	Food Water Resource Natural Resource Energy Resource Coastal Resource and Infrastructure	Food product, fruit, presence of edible species, animal and plant, seafood, natural food, farming, water, energy, raw materials, fisheries, agriculture, drinking, eat, dock, transportation, fuel, timber, oil and gas, fresh water, salt, industry, settlement, infrastructure, pipe, cable,	Produk makanan, buah, kehadiran spesies yang dapat dimakan, hewan dan tumbuhan, seafood, makanan alami, pertanian, air, energi, bahan baku, perikanan, pertanian, minum, makan, dermaga, transportasi, bahan bakar, kayu, minyak dan gas, air tawar , garam, industri, pemukiman, infrastruktur, pipa, kabel,
2.Regulating	Soil Climate Regulation Waste Treatment Coastal Protection Water and Air Regulation	Waste, disposal, treatment, Contamination, carbon sequestration, vegetation, agriculture, pollution, protection, restoration, noise, dust, storm, flood, fresh water, Dike, inundation	Sampah, pembuangan, pengobatan, Kontaminasi, penyerapan karbon, vegetasi, pertanian, polusi, perlindungan, pemulihan, kebisingan, debu, badai, banjir, air bersih, tanggul, genangan
3.Cultural	Aesthetic Value Sense of place Tourism Heritage	Iconic landscape and place, historical place and landscape, recreation, entertainment, festival, heritage,	Lansekap ikonik dan tempat, tempat bersejarah dan lansekap, rekreasi, hiburan, festival, warisan,
4.Supporting	Maintenance of ecosystem bio diversity Supporting Habitat	Suitable habitat, living space, food cycle, variety of animal, plant, fish, natural protection	Habitat yang cocok, ruang hidup, siklus makanan, keanekaragaman hayati, binatang, tanaman, ikan, perlindungan alami

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## IV Research Finding and Analysis

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### IV.I INSTITUTIONAL CONTEXT JAKARTA (INDONESIA)

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Indonesia has a long history in centralistic approach. The Government used to have great role to issued permit for planning and development. Their planning culture have been influenced by the Dutch comprehensive approach, In this planning tradition spatial planning is integrated in a systematic way with formal hierarchy from national to local level. Institutional arrangement and regulation in public sector with its activity across different sectors being coordinate by the government. The focus of comprehensive approach is specifically on spatial coordination rather than economic development. (Hudalah & Woltjer, 2007). However this system have not been adopted completely, it is being displaced by land use management approach. The purpose of this system is to accommodate economic development especially for authorities and government to promote property and land use development. Nevertheless in Indonesia discretion in land use management approach are not limited to local government only, but also the provincial and central government responsibility. According to the spatial Planning act no 26 of 2007, all levels of government from city to provincial have the obligation to make their spatial plans in order to promote their spatial development in their territory. This kind of situation in Indonesia Planning system make it more challenging to integrate ecosystem service in different institutional design into the policy. Basically the entire spatial and management plan will be referring to the national spatial and management plan, after that each province and cities make will interpretation from the national guidance then try to synchronize it with their cultural condition and spatial diversity. There can be various possible outcomes from this situation, it's also difficult to make generalization and share solution between cities since every region have different characteristic in their territory. Institutional arrangement that take into account of cultural and spatial diversity can be one of the key to ensure sustainable development in coastal zone.

Indonesia Planning system has some characteristic background that could be important, first characteristic are cultural diversity. The second characteristic are past transition from unitary state to decentralize structure has create inconsistent and fragmented system, the idea of decentralization is irrelevant with Javanese culture institutional arrangement such as : clientelist governance arrangement and zoning instrument. Another important factor is copying neoliberal ideas without proper coordination between existing institutional structures creating potential conflict between the systems. (Hudalah & Woltjer, 2007).

Jakarta is the capital city of Indonesia and located on the northern coast of the Island of Java. Inside the territory there are deltas of 13 rivers discharge into Jakarta. The city is part of a rapidly growing urban agglomeration within 30 million people.(Ministry of Public Works,2011). In order to meet their needs, human being was one of the main actors of this ecosystem degradation. The need of Ecosystem Service increasing every years, it force government to make "trade-offs" among the services ; mangrove forest has been cut down to give space for human settlement, and in certain area marine fisheries have been depleted because overfishing. Existing Jakarta Mega cities (Jabotabek) development, policies and regulations do not recognize Jakarta Bay as important component of the Jabotabek ecosystem. Development programmes in Jakarta are still inland oriented (Fazi et al, 2001). Major change is needed in land use policy to overcome this current situation, environmental objective need to be address. The management objective and decision making needs to address Ecosystem service. There are some ecosystem services that can be indentified in Jakarta and can be use as a tool to improve spatial Planning in coastal area. Lesson drawn from underestimate ecosystem function and over extraction of its service is human made disaster such as: flood. In Jakarta, uncontrolled deep ground water extraction for water consumption continuously cause land subsidence at a rate of 10cm/year in certain part of North Jakarta. Accumulated with the sea level rise, this caused flood area in Jakarta to reach 203 square kilometres in 2007.

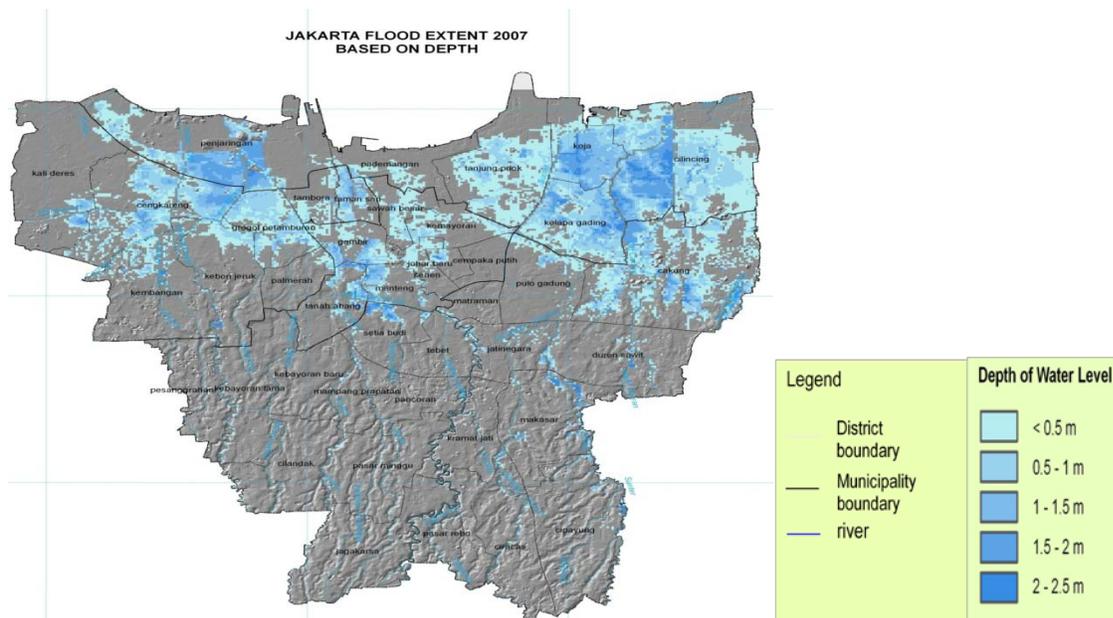


Figure 5 : Jakarta flood Extent 2007 (Ministry of Public Works, 2011)

The main cause of flooding that related to Ecosystem Destruction:

- Decrease in average soil 10 cm per year due to groundwater over extraction to meet the demands of water consumption;
- Lack of water retention capacity in Highly Populated coastal areas;
- Urbanization in upstream, deforestation, sedimentation, and waste disposal in rivers and drainage channels;
- *Disappearance of mangroves*: Originally the whole north coast of Java was covered by mangroves, which acted as a natural protection against waves and abrasion. These mangroves have gradually disappeared, due to pollution and to make place for fish ponds, salt production fields and other economic uses. Mangroves in Jakarta Bay have greatly disappeared, especially in the DKI Jakarta area.

Another Ecosystem Degradation in Jakarta coastal zone is erosion, salination, compaction, nutrient depletion, pollution, and urbanization (Ministry of Public Works Republic Indonesia. 2011). Jakarta is very dependent in their coastal zone Ecosystem including river basin and canal to support their economic activity. To overcome ecosystem issue in coastal areas, Coastal spatial Planning need to give attention to the Ecosystem Service in their policy planning and how it can develop in the future leading to more sustainable and multi-functional land management. According to the spatial pattern plan in Jakarta (figure 6) coastal area divided into industrial zones (eastern part), office zones (central part), settlement zones (western part) and green zones. These coastal areas are filled with economic, socio cultural and environmental functions.



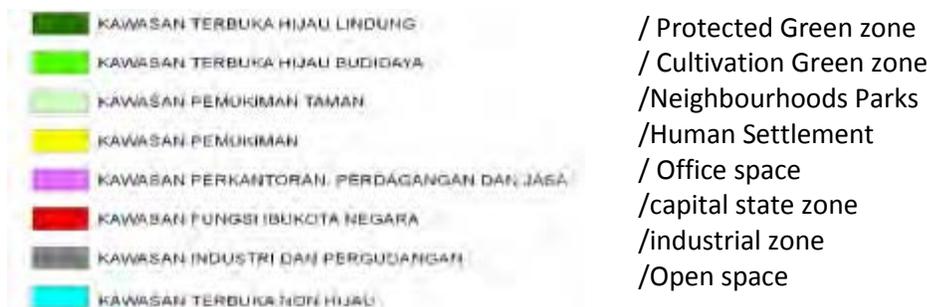


Figure 6 Jakarta Bay Section of DKI Jakarta Spatial Pattern Plan (Source: RTRW DKI Jakarta 2011 - 2030)

#### **IV.2 Analysis of Ecosystem Service**

Ecosystem service analysis will be performing using the general and specific plan related to planning context in Indonesia and more specifically in Jakarta. Two different level of this plan will be executed and both documents will be examined using Ecosystem framework that already being mention above. In every document will be explained what ecosystem service are emphasized and what type of ecosystem service are less or not mention on the document. Brief summary of how ecosystem being addressed in general and specific plan will be given.

Table 8 **ESS in General Plan**

ESS mention	Codes	Description/Specification on the documents
1.Provisioning	Food Water Resource Natural Resource Energy Resource Coastal Resource and Infrastructure	<ul style="list-style-type: none"> <li>• Spatial Development base on sustainable use of natural resource</li> <li>• Utilization of Coastal resource will be : agriculture, Salt utilization, fisheries, bio technology, energy use, bio pharmacy, pipeline, and marine tourism activity.</li> <li>• Utilization coastal resource have to addressed carrying capacity of ecosystem especially for water resource</li> <li>• Preventing negative impact on natural resource and environment</li> <li>• Protecting natural resource</li> <li>• Spatial Planning consist of multiple land use in management of water, air and natural resource in the territory</li> <li>• Protect, conserve, enrich, optimizing the use of coastal resource and ecosystem in a sustainable way</li> <li>• Utilization of sea water beside for creating Energy, will need to have permit.</li> <li>• Land reclamation</li> <li>• Conservation zone are restricted to utilization</li> <li>• Access to clean water and tap water</li> <li>• Local value need to addressed</li> </ul>
2.Regulating	Soil Climate Regulation	<ul style="list-style-type: none"> <li>• Minimum requirements of forest/green areas in the River basin</li> </ul>

	Waste Treatment Coastal Protection Water and Air Regulation	<ul style="list-style-type: none"> <li>• Use eco friendly technology in utilization coastal resource</li> <li>• Zoning space for protecting areas</li> <li>• Manage artificial environment to support natural environment</li> <li>• Green zone for urban areas and water retention</li> <li>• Disaster mitigation</li> </ul>
3.Cultural	Aesthetic Value Sense of place Tourism Heritage	<ul style="list-style-type: none"> <li>• Zoning space for Cultural areas</li> <li>• Protecting cultural heritage</li> <li>• Marine tourism</li> <li>• Local value</li> </ul>
4.Supporting	Maintenance of ecosystem bio diversity Supporting Habitat	<ul style="list-style-type: none"> <li>• Protecting various of habitat and ecosystem (only in general, not mention explicitly about soil and vegetation maintenance),</li> <li>• Rehabilitation in the coastal zone to restore ecosystem service</li> <li>• Green zone for urban areas and water retention</li> </ul>

#### **What Ecosystem Are Being Mention And Emphasize?**

In the general plan we can conclude that provisioning service and regulating service being emphasize more. Coastal ecosystem services are mention in general as a resource that need to be protecting and will be use in a sustainable way. In the general plan All the spatial development need to addressed Natural resource and important element inside it such as: water and air quality. In order to protect these natural and water resource, the plan is focus on using zoning and multifunctional land use as a base of spatial development. Regulation services in this document are being mention in *climate regulation* with focus on minimum requirement for forest in the river basin area and obligation to allocate certain area to be used as water retention. The plan also mentions how coastal ecosystem can be managed and what type of activity that need attention from municipality. Utilization of coastal resource beside energy will need strict permit from authority, those activity outside energy activity are : production of salt, bio technology in coastal, pipeline for oil and gas extraction. The plan also emphasized to use eco friendly technology in coastal management and to ensure carrying capacity of water resource are being recognized. Permit will be granted if the proposal is addressing sustainable use of coastal ecosystem.

As an archipelago country Indonesia has already give attention in protecting their coastal ecosystem. Water resource and disaster mitigation are some of the important thing that being mention and have to be applied by municipality according to their geographic area and development. In order to protect and prevent negative impacts on the environment due to the use of space the spatial plan

defined at least 30 percent of river basin areas must be protected as forest areas. This plan can be interpreted by all province and municipality in their basic spatial development. However there are some protected area and special function area that already being established by the national government, for example area that contain rich bio diversity or rare species such as komodo island, Bunaken national parks and Wakatobi national parks.

Cultural service also being recognized within the plan as a heritage that needs to be protected. According to the plan these area have limited access to utilization even some place are not allowed to be exploit. Tourism also being recognized as important aspect to human activity, some of the coastal area must be open for public as a recreation place. Another important aspect is local value inside the community that need to be addressed differently in each location by local authority. Relevant stakeholder especially local community need to take into account in coastal management. This community usually have their own way in protecting ecosystem service and how they used to manage this service.

#### **What Ecosystem Are Lack of attention or not mention?**

The plan don't mention explicitly the importance of soil and vegetation protection as a part of supporting service, however the plan only mention that in spatial development and coastal management it's important to conserve and protect bio diversity within the ecosystem. Cultural service is being addressed in the plan as protected areas and conservation zone with high bio diversity and need to be maintain, moreover this plan don't mention historical place as a cultural place that need to be protected. Sense of place is one of the element in cultural services that are missing in this documents. Historical monument could be seen as a symbol for the city and nation, so it needs to be recognized and protected. Another drawback from the policy document is how ecosystem service could be protected against global issue like climate change and sea level rise. Although the document also mention about disaster mitigation it is still not clear how it can be implemented and how it can be measured. Ecosystem service in the coastal zone according to the document can be managed with permit system. Nevertheless how ecosystem services being managed even with legal permit are still in the framework of *open system* and treated as common property. In the general plan there are no boundaries or limitation in how far exploitation of ecosystem resource could go. If there are also no clear boundaries in the municipal level this could create potential problem in the future. Potential problem may occur are resource depleted and ecosystem destruction in the coastal zone.

Table 9 **ESS in Specific Plan**

ESS mention	Codes	Description/Specification in the documents
1.Provisioning	Food Water Resource Natural Resource Energy Resource Coastal Resource and Infrastructure	<ul style="list-style-type: none"> <li>• Water resource management and recognize the role as delta city</li> <li>• Coastal conservation zone to protect coastal ecosystem and for science and education center for marine species.</li> <li>• Urban area for social, economic and administrative activity</li> <li>• Improve the city quality of life</li> <li>• Supporting the role as capital city of indonesia</li> <li>• Multifunctional land use</li> <li>• Transit Oriented Development</li> <li>• Improve urban infrastructure</li> <li>• Spatial development to meet the needs of its citizen (Jakarta) and enhance its productivity</li> <li>• regional development which can ensure the persistence of ground water and surface water conservation</li> <li>• integration water management with upstream level</li> <li>• increase port capacity and development</li> <li>• securing energy supply</li> <li>• control agriculture and cultivation activity in order not to exceed carrying capacity of ecosystem</li> <li>• sustainable use of coastal zone</li> <li>• land reclamation and revitalization of Jakarta bay</li> <li>• prohibit any activities and buildings construction that can destroy/harm function in agriculture area</li> <li>• developing sustainable <i>sea farming</i> area that recognized the existing area of coastal protection zone</li> <li>• coral reef area are prohibited from any form of exploitation</li> <li>• any form to exploit sea sand are prohibited</li> </ul>
2.Regulating	Soil Climate Regulation Waste Treatment Coastal Protection Water and Air Regulation	<ul style="list-style-type: none"> <li>• 30 Percent Minimum requirements for green zone in Jakarta territory</li> <li>• Zoning space for protecting areas</li> <li>• Green zone for urban areas</li> <li>• Adaptation and mitigation to overcome global warming/climate change</li> <li>• Rehabilitation of Ecosystem</li> <li>• Water retention to control surface water and prevent flooding</li> <li>• Protected green zone to maintain local environment quality</li> <li>• Water catchment management to control waste water, embankment, reservoir, river and canal.</li> <li>• Maintain Spatial Quality</li> </ul>

		<ul style="list-style-type: none"> <li>• Accommodate evacuation/ emergency space in disaster situation</li> <li>• trash and waste recycling</li> <li>• Reduction in greenhouse gas emissions</li> <li>• Preparing infrastructure for disaster mitigation</li> <li>• Green zone and parks as balancing tool for ecology(air quality, water catchment, social activity) inside the cities</li> <li>• Green zone function in certain area cannot be changed</li> <li>• Embankment, groynes, and coastal protection tools must be build using eco friendly material with the</li> <li>• plantings mangrove step by step</li> </ul>
3.Cultural	Aesthetic Value Sense of place Tourism Heritage	<ul style="list-style-type: none"> <li>• Zoning space for Cultural areas</li> <li>• Enrich Urban culture</li> <li>• Improve traditional market and social facility</li> <li>• Improve and develop tourism location</li> <li>• Improve tourism capacity to accommodate MICE</li> <li>• Revitalization of the Old Town Batavia as a centre of historical and cultural tourism activities.</li> <li>• Maintain and develop cultural heritage</li> <li>• prohibit any activities and buildings construction that do not have appropriate function in the heritage area</li> <li>• coastal protection zone can be use for tourism such as : diving, snorkelling, and fishing tour</li> <li>• recognize local/traditional value</li> </ul>
4.Supporting	Maintenance of ecosystem bio diversity Supporting Habitat	<ul style="list-style-type: none"> <li>• Protected area can be island or forest with authentic rich biodiversity as supporting habitat and life support system.</li> <li>• Maintain Spatial Quality</li> <li>• Restoration habitat/environment for priority areas.</li> <li>• Supporting habitat being manage with zoning system (divided into core zone and protecting zone)</li> </ul>

### **What Ecosystem Are Being Mention And Emphasize?**

Jakarta has created a comprehensive approach of ecosystem service in their specific plan. In the provisioning service the plan describe every codes and element that are being used as indicator to identify how ecosystem service being mention. The plan emphasizes spatial development that will meet the demand of its citizen in multiple sectors and enhance their productivity. In order to do that the plan describing the importance of water resource and food management in the city. Water management are integrated with upstream level and agriculture activity is being protected from any activity that can disturb their function to produce food. The plan also encourages using coastal resource for sea farming

place to support food supply for the cities. Nevertheless the plan also recognized the importance to control agriculture and cultivation activity in order not to exceed carrying capacity of ecosystem service. Energy supply is also being mention as one of the important priority in the plan. All the facilities and infrastructure are being maintained and improve to secure energy supply while at the same time energy alternative also being encouraged to be developing for diversity. The plan is also giving attention to the environment and protected area. Coastal conservation zones only can be use for education and science function while some area like coral reef are not allowed for any activity intended to extract resource. The plan also mentions to improve urban infrastructure to provide support for all activity and also to improve quality of life in urban areas. Regulation services are also being mention from many aspects in the plan. To maintain the soil, ground water protections are being mention in the plan. Allocation of space for water retention is also important for soil and water regulation. The plan also proposes to grow mangrove tree step by step to as natural protection for coastal zone. Climate regulation is also being addressed in many aspects. The plan are mention adaptation and mitigation strategy to overcome global warming and to preparing the cities from natural disaster. Reduction in gas emission are being describe in the plan by re-arrange industrial area only for non polluting, low energy consumption and high technology industry. Waste and sewerage coming from household and industry also being mention in the document. Network system and infrastructure have to be prepared to isolated and recycling all incoming waste. Waste water pipeline are being separated and isolated from public drainage system.

Revitalization of historical city Batavia is also important feature from the plan. It represents cultural heritage and sense of place in ecosystem service. Revitalization will also attract tourist and increase income from tourism. The document also mentions to improve facilities to attract more tourists to come from Jakarta. One of the facilities are modern building and hotels that can be used for meeting and conference (MICE). Coastal zone is also one of the areas that being developed for tourism, many attractions are being made such as diving, snorkelling and fishing tour. The sea sand one of the attraction in the beach that also give natural protection for the coastal zone are given special attention and being protected. Island and forest that has role as supporting habitat in ecosystem service is also being protected according to the document. Local community also involved in protecting this habitat. The objective is not only to have better monitoring system but also to growing awareness in sense of place and responsibility to their environment.

### **What Ecosystem Are Lack of attention or not mention?**

Even though water most aspect of ecosystem are given special attention on the document some part of ecosystem service remain missing. Climate regulation already being mentions however the implementation procedure to overcome sea level rise are not clear. The documents do not mention basic guidance or prevention method to overcome this situation. Currently some area of the Jakarta bay are located below sea level, it is important to make clear measurement to overcome potential flooding especially in the rainy season. Other problem may occur regarding location for emergency situation in natural disaster is still not clear. There are no exact and clear location where should relocation are taking place. Even though the document has identified every area that has potential effect from disaster, criteria for emergency area needs to be mentioned as well. If it is not mentioned, this will create difficulties for public official to perform fast response in the evacuation program.

### **Conclusion of Ecosystem Service in the Policy**

Provision services are being describe comprehensively in the general and specific plan. These service indicate the production and scarcity of resource, it directly create an effect to the human well being. Sustainable use of this service according to the document will help human being to maximize their benefit of ecosystem service. Regulating, cultural and supporting service have being addressed more in the specific plan of Jakarta rather than in the general plan. Together, these services indicate quality of life in human well being. Fulfilment of basic needs and recreational opportunities come from these services and already receive good attention on the specific plan. Nevertheless disaster evacuation are still not clear in the document, it is important aspect to be recognized. Since security from disaster indicate security for human well being.

### **IV.3 Analysis of Institutional Design Tools**

The next step is to identify and analyze what type of tools is being mention and how it mentions according to institutional design levels. These tools are mention in the document and can be use to implemented ecosystem service in the planning context.

**Table 10 Institutional Design in General Plan**

Institutional Design	Codes	Description/Specification on the documents
1.Macro (Governance)	High Level Government, General Rules	<ul style="list-style-type: none"> <li>• General taxation rules (high taxes)</li> <li>• Penalty/sanctions (province/cities obligate to achieve minimum requirements for green zone according to constitutions)</li> <li>• Permit system</li> </ul>

<p>2. Meso (Inter-organization, Cordination)</p>	<p>Inter-organization, coordination Finance Mechanism</p>	<ul style="list-style-type: none"> <li>• Compensation and Penalty</li> <li>• Incentive and disincentive</li> <li>• Sanctions to public and private company (related stakeholders)</li> <li>• Restriction to get public service/infrastructure for developing in Green zone and Protected areas</li> <li>• Creating guidelines according to certain situation</li> <li>• Distribution of power and responsibility between National government, Province, and local government.</li> <li>• Communication involving relevant stakeholder</li> <li>• Zoning regulation</li> <li>• Evaluation and supervision process</li> <li>• Coordination and socialization to apply regulation</li> <li>• Community development and public participation</li> <li>• Contribution reward to relevant stakeholder</li> <li>• Tax relief as a reward</li> <li>• Access to Permit system according to the regulation different on each agency</li> <li>• Local community have privilege to get management permit</li> <li>• Encourage Public Private Partnership in coastal management</li> </ul>
<p>3. Micro (Intra-agency/ agency)</p>	<p>Intra Organization/Agency</p>	<ul style="list-style-type: none"> <li>• Monitoring</li> <li>• Expand information</li> <li>• Expand institutional capacity</li> <li>• Research and development</li> <li>• Education and training</li> </ul>

**Table 11 Institutional Design in Specific Plan**

Institutional Design	Codes	Description/Specification on the documents
<p>1. Macro (Governance)</p>	<p>High Level Government, General Rules</p>	<ul style="list-style-type: none"> <li>• Taxation rules</li> <li>• Penalty and sanction</li> <li>• Permit management system</li> </ul>
<p>2. Meso (Inter-organization, Cordination)</p>	<p>Inter-organization, coordination Finance Mechanism</p>	<ul style="list-style-type: none"> <li>• Develop new social and economic centre</li> <li>• Improve and develop quality of an area according to its function</li> <li>• Avoid ribbon Development</li> <li>• Develop mass rapid transportation</li> <li>• Develop multi functional zone to integrate various strata in the society</li> <li>• Zoning regulation</li> <li>• Compensation for develop historical site</li> </ul>

		<ul style="list-style-type: none"> <li>• Incentive to the settlement area that having or support green zone</li> <li>• Incentive to agriculture area</li> <li>• Prohibit any activities and buildings construction that will create damage of appropriate function in the certain area</li> <li>• Set boundary permit for operational boat in fisheries area (create max limit for fisherman in certain area)</li> <li>• Setting rules/criteria for fisheries activity and tool that are being use by fisherman</li> <li>• Person and private company need to have permit to participate in resource extraction in coastal zone</li> <li>• Encourage Public Private Partnership</li> <li>• Alternative finance mechanism</li> <li>• Encourage Community development program</li> <li>• Encourage public participation</li> <li>• Sanction will be given to any violation of spatial planning to responsible parties according to its respective category</li> <li>• Cutting/increasing tax payment according to situation</li> <li>• Reducing retribution outside tax</li> <li>• Special treatment to get permit</li> <li>• Creating reward</li> <li>• Limiting/easy access to facilities and infrastructure</li> <li>• Communication and publication between stakeholder</li> <li>• Cross subsidies</li> </ul>
<p>3. Micro (Intra-agency/ agency)</p>	<p>Intra Organization/Agency</p>	<ul style="list-style-type: none"> <li>• Increase capacity and intensity of public transportation network</li> <li>• Monitoring and evaluation</li> <li>• Zonation rules are describe in text and map</li> <li>• Enhance institutional capacity</li> <li>• Education and training</li> <li>• Research and development</li> <li>• Develop technology information for spatial planning</li> <li>• Easy access for information</li> <li>• Improve quality and effectivity management of spatial planning</li> <li>• Improve capacity and independency within the agency</li> </ul>

Institutional design in Macro level

Institutional design in macro level can be identified by all general (common) rules that is applied in Indonesia. There are some tools that being used in Indonesia general plan such as: permit system, Penalty and taxation rules. According to the general plan all these tools are being used to design national spatial systems that are productive, comfortable, safe, and sustainable. Institutional designs in

macro level serve as a legal basis for spatial development not only for National government and Local Government but for the whole society in Indonesia. This is common rules that can be applied in all levels to achieve protection of space and prevent negative impact to the ecosystem due to the use of space.

*General tax* is often use in national and municipality level to increase or prevent spatial development, by stipulating or limiting growth so the activity will be in line with spatial planning. High taxation rules can be adjusted by municipality according to the cost that required overcoming environmental effect caused by utilization of space. On the other side tax reduction can be given to all the parties that support development according to the spatial plan.

*Penalty and Sanctions* is another way to control the use of space. This is enforcement action to all parties that are doing activity in spatial development in a different path from the spatial planning. In Indonesia is not only developer or private parties that can be charged by penalty. Public official that are proven to give the wrong recommendation or wrong decision according to the spatial plan also can be sentence to penalty.

*Permit system* is intended as an effort to control the use of space so that each activity in the spatial development can be made accordance to the spatial plan. Permits can be designed by the national government or the local government according to their respective authorities. Relevant stakeholder who have the interest in manage the resource from ecosystem service and any activity that take place in coastal zone will have the obligation to apply for this permit.

### *Institutional design in Meso level*

Institutional design in meso level involves implementation and process. This type of institutional design includes utilizations of inter-organizational networks and the creation of new organizations. There are some tools in the documents that can be categorized in this level. Relation and activity between involving parties are most common to be in this level. Retribution or incentive outside tax usually one of the benefit that government can give to private parties, or national government to province and municipality as appreciation for their contribution in spatial development that in line with the spatial planning or zoning regulation. In Jakarta housing developer will be given incentive by the government if they can provide green zone alongside with the settlement they build. Another form of incentive also can be given to people or company whose land is being used for historical building without changing the ownership status. Another example of incentive in Indonesia are incentive can be given to the provision of land to be develop for agricultural use.

*Incentives* also can be seen in the form of access to infrastructure or license to manage coastal resources. Incentive can be provide when there are effort from private party to support the government accelerate spatial development according to the spatial planning, the government will support the developer in providing infrastructure such as road, and bridge construction. Another non tax incentive is permit system to manage coastal resource. Any private parties or developer who can give contribution such as :addition of green space, flood prevention, efforts to overcome problem of traffic congestion, and urban renewal will have the privilege to 'right to utilize' coastal resource or will be given award with the same respective value according to the regulation. This type of incentive will encourage public private partnership and public participation to give contribution for spatial development and working with government. To conclude any form of governance that involves other parties outside the government in deliberative action to contribute in spatial development can be categorize into meso level.

#### *Institutional design in Micro level*

Intra organizational level analysis role and responsibility inside the agency. These type of institutional design most of it are related to principle like: expertise in the office, new experimental project for the organization, better organization, different way to work and different monitoring for organization. The agency role in Jakarta specific plan are to monitor and evaluate implementation of spatial planning then to improve its quality and effectivity. The agency also develop technology information to collect data and to simplify communication process. The document also mention that zoning rules and regulation should be describe in text and map to support implementation process and to make it more easy to understand. Research and development also mention in the document to expand institutional capacity, training also one of the program that being mention to improve employ skill and capacity.

#### **IV.4 Linking Ecosystem service and Institutional Design tools**

Coastal management based on ecosystem approach are important so there will be no longer utilization and exploitation on the coastal resource that ignored carrying capacity of ecosystem service and to ensure conservation efforts and sustainable use of ecosystem service. This paragraph will describe how institutional design tools can be used to address ecosystem service.

*Imposition of high taxes* can serve as alternative solution to implement ecosystem service. This tool can be related to the use of space and utilization of coastal resource. Spatial development against

principle of ecosystem approach can be imposing a higher tax than the usual. High taxation rules also can be imposing by municipality according to the cost that required overcoming environmental effect caused by utilization of space. By imposing high taxes, people will be aware that the value of ecosystem service is priceless and some even cannot be replaced.

*Incentive and penalties* can be use as a control or managing ecosystem service. Incentive can be used to encourage private parties to participate in spatial development yet also supporting ecosystem service. Any private parties or developer who can give contribution such as: addition of green space, flood prevention, waste water recycle, and urban renewal will be given incentive to do their project. This will encourage private parties to develop their innovation and idea to protect ecosystem and improve spatial quality in order to get the incentive. *Penalty* can be effective as control and punishment for any developer or municipality that doing different path of spatial development and doing ecological damage on ecosystem service. For example land for agriculture use cannot be converted into industrial use or the responsible parties will have to face serious sanctions and high penalty from the court. This also will create balance between ecosystem service category so there will be no ecosystem service are forgotten.

Using modern *Technology information* on spatial planning also could be applied in the agency as a way to improve and develop ecosystem services. This method will enable local agency to gather data about ecosystem service more comprehensively and effective. Complete information will also help decision maker to decide utilization of ecosystem services. The agency also could make historical record in how ecosystem is being used in the past as valuable information to decide what they are planning to do in the future.

*Coordination and communication* is also important tool for implementing ecosystem service. As we may know there are many stakeholder are involved in using coastal resource. Better understanding between each parties will synchronized their objective and it will be possible for the entire stakeholder to support each other. One of the instruments in the meso level to protect and develop ecosystem is by creating multifunctional land use. Collaboration from all involving parties is needed. Every aspect and ideas have to be taking into account. Local government must negotiate with private parties to get their support, and vice versa. Eventually proper communication from all relevant parties will clarify their contribution and responsibility to implement the project.

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## V Conclusion

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The aim of this research is to explain how institutional design and ecosystem services could be implemented in spatial planning. The Millennium Ecosystem Assessments has already provide some insight information that can be used to improve ecosystem while maintain sustainable production of their multiple service for human being. Even though ecosystem service received many attention from various study and being acknowledge recently in many policy and regulation. However there are still implementation gap that remain in how Ecosystem service can be use in the practice, and how the policy can recognized institutional arrangement to improve ecosystem services. This study try to make contribution by link up ecosystem services in concept into practice, with help of the tools from institutional design in ecosystem services within spatial planning documents.

This research has started with brief explanation of what can be understood from ecosystem service and institutional design. From that point we try to identify what institutional design and ecosystem services are being used in the current document to create the framework. The objective of this research is to establish a framework for implementing ecosystem services in different level of institutional design in the spatial planning. This framework will help to understand how ecosystem service can be put into practice with institutional tools. The frameworks that being presented at the end of this chapter are consist of ecosystem category and institutional design level. Every ecosystem services category that are the provisioning services, regulating services, cultural services and supporting service divided into 3 different levels of institutional design which is Macro, Meso, and Micro(table 12).

Instrument and tools that are mention in this research is being analyzed base on Jakarta Spatial Planning and the National Spatial Planning. Coastal Ecosystem is very important to these community but also very vulnerable. Human activities that take place in the environment consistently create ongoing changes that give negative influences to the ecosystems. Effective evaluation should be conducted in cross scale and multidimensional interactions. Implementation gap of ecosystem service in practice can be described by using institutional design tools in different level to achieve better implementation in the future. This content analysis study give description of how ecosystem service are being addressed in coastal spatial planning and what kind of institutional design tools are being recognized in the documents. According to the document, ecosystem services already being acknowledge in the general and specific plan however some of the services can be interpreted with tendency to overlapped among each other. Jakarta has cultural diversity characteristics, every decision making and institutional arrangement in spatial planning will have to take into account this diversity in order to make spatial

development become effective and sustainable for ecosystems. This study provide framework that could analyze different ecosystem services category using tools of institutional design in different levels.

### **Recommendations**

Recommendations for Jakarta in the meso level of institution is to improve water management capacity in ecosystem services. Land subsidence can be stopped by providing water supply from pipeline to every household. Incentive can be provide to private company that could provide water supply and give contribution to water management. In the micro level public campaign can be use to educate community that live on river bank not to use ground water. Local agency could conduct awareness campaign to these community, collaboration between the community and government institution will create better probability to achieve ecosystem protection. In the macro level spatial planning also need to consider to combine the element of 'precautionary' and 'prevention' with the element of 'reconstruction' to prevent further damage on ecosystem services. Ecosystem based approach in multifunctional land use could be seen as an alternative in spatial development of Jakarta.

To conclude final recommendation will be given to policy maker outside Jakarta to see ecosystem problem in a holistic way, and to see through more than one point of view of institutional design levels perspective. Every environment or ecosystem has different characteristics. It will need different solution and tools with different institutional arrangements. The tools that can be use in the framework will be depend on the type of problem inside the institutional levels. Combination of institutional design tools in certain place cannot guarantee will also be effective in another place. Nevertheless collaboration and combination of tools can be encourage in spatial planning to ensure that every levels of institution is already connected, to make sure that decision making in the lowest level already being done in accountable and transparent, and to identify are decision maker already synchronizing with the upper level or lower level of institutional design level. Finally combining various tools could give a hint for available solution that could be taken and what are the effects of intervention or action for protecting ecosystem service in one level to another. Combining various tools in different level with different problem will give more strength, security, and sustainability for the institution at the highest level and the lowest level. These also will create learning process from various possibility and outcome for better implementation of ecosystem services in spatial planning.

## The Framework

We can see the problem in a holistic way through this framework, first we can identify where is the problem exist (macro, meso, or micro?) after that we can calculate every possibility tools that are open for approach according to the objective that we want to achieve. To conclude we can decide to choose the best way or evaluate on every level of institutional design and to execute all of the approach in every level, or to make combination approach that are possible and suitable for the current situation. For example do we only need to improve the agency capacity, doing coordination with other agency and parties or even to change the whole system by changing the constitution.

ESS	Stakeholder	Instrument	Objective
1.Provision a. Macro b. Meso c. Micro	Government  Private Parties  local community  Local government	General rules, taxation rules, incentive, penalty, high taxes, coordination, communication, evaluation, training, etc	Control of space, alternative financing, ecosystem protection, rehabilitation ecosystem, spatial development, collaboration, improve agency capacity
2.Regulating a. Macro b. Meso c. Micro	Government  Private Parties  local community  Local government	General rules, taxation rules, incentive, penalty, high taxes, coordination, communication, evaluation, training, etc	Control of space, alternative financing, ecosystem protection, rehabilitation ecosystem, spatial development, collaboration, improve agency capacity
3.Cultural a. Macro b. Meso c. Micro	Government  Private Parties  local community  Local government	General rules, taxation rules, incentive, penalty, high taxes, coordination, communication, evaluation, training, etc	Control of space, alternative financing, ecosystem protection, rehabilitation ecosystem, spatial development, collaboration, improve agency capacity

4.Supporting	Government	General rules, taxation rules,	Control of space, alternative
a. Macro	Private Parties	incentive, penalty, high taxes,	financing, ecosystem protection,
b. Meso	local community	coordination, communication,	rehabilitation ecosystem, spatial
c. Micro	Local government	evaluation, training, etc	development, collaboration, improve agency capacity

**Table 12**

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