

A Proper Implementation of Water Resources Development, in Integrated and Sustainable Aspects

(Two points of Critics on Disregard Implementation of The Act No.7 /2004)

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Abstract- Due to the Act No.7/2004, there are two main purposes in Water Resources Development (WRD), that are *effectiveness and efficiently in usefulness* of water, *means integrated and sustainable WRD multipurposes and fight against water destroying behaviors by flood control proper implementations*. Planing and Programming involving all the stake holder needs on WRD should be provided to accomplish the optimum development on related physical resources. The needs of water for irrigation, domestic and municipal purposes, industrial use, power etc, would be analysed corespond to the consumptions related to the present and future needs for populations useness in the integrated and sustainable frames. A good stake holders *coordination* in all aspects of *quantities and qualities* for all the water needs a *proper execution* to achieve the most important priority in WRD and *strike supervision* in managing project all will be the keys of success of the WRD project.

In *flood control planning and programming should be used the right philosophies of floods*, that means *based on hydrological cyclus in a river system*. *River systems* which are consists of *collecting-transporting* and *dispersal sub-systems*, the hydrology cyclus water running through the three sub-systems from the sea, precipitated in the cathment area, erosed top soil (as in the *collecting sub-system*), transporting water and sediment, sedimented along the river course (as in the *transporting sub-system*) and water disperse to the sea include sediment which dominantly sedimented in the estuaries (as in the *dispersal sub-system*) are the causes in flooding. From that's points flood control should be taken into account to have the right solutions for each sub-systems by *Watershed Management, Flood Control Engineering and River & Coastal Engineering* correspondly.

Mapping of the needs of society means purposes of water uses such as for agricultures, domestics, industrials, waste, recreation, power etc, sources of water (rain, surface water, ground water) availabilities, methods of development, allocation and distribution system, *future developing and programming* will be kept as *integrated and sustaianable programme*.

Many interests or understandingless of WRD that may be as constraints that affected in the implementation of WRD, therefore coordination in management of water suply on keeping water resources availability, serving-distributing, funding, planning and programming for the now and future needs will be the key of success indeed.

But unfortunately there are two points in *usefulness of water* and *flood control concepts* of solutions still ought of proceeds. By these paper hopes as for critics on disregarded implementation of the Act No.7/2004, and would be improving in planning and programming in WRD and mainly as the input for the Directorate General of Water Resources Development - Department Public Works and Public Housing.

Keywords: water needs, present and future mapping, coordination-programmes, integrated, sustainable, cyclus hydrology

1. Background

The Act no.7 years.2004 of Water Resources Development with the main purposes are integrated and sustainable of water availibilities should be implemented and performed promptly, *but up to now the stake holders as the executors of the Act it is realy do not works as well as needed.* Planning and Programming the use of water for the human needs of living still beyond the purposes of integrated and sustainable means.

The Act no.7 years 2004 stressed that the stake-holders (states and privates and people sides)should managed the usefull of water integrated, hollies and wishes in order to have water sustainable availibilities for the future, by mapping the potentially water availibilities in three sources as *hydrology cycle, hydrography, and hydrogeology*, the use of waters by stake-holders in the present and future time, planning and programming the explorations, all will be implemented in every regions in Indonesia.

Evaluation of the present and the future conditions due to the *potencially water availibilities and needs* of all aspects of living, *coordination as integrated planning and programming in rights, duties and responsibilities of the stake-holders involds.* These, not only in the problems of water used availibilities but also in the problems of water fighting measures as in the flood control solutions.

2. Research Metodology

Based on the fenomenon in the fields, there are many state institutions as regulator such as (in Indonesian) Dinas-Dinas: PSDA, Pertanian, Perkebunan, Perindustrian, ESDM, PDAM, etc, and privates and people as user of water and alls which mainly are involds in water using, do never have understood of how much the potentially water availibilities and their needs at the present and future. Their do not care how to make sustainable water availability in all time.

The Act no.11 of years 1974 about River System Managements was improved by the Act no.7 of years 2004, as for Integrated and Sustainable of Water Resources Development, means that water resources and usefullnes of water should be managed effectively and efficiently. All will be done by integrity, overall balancing and with participation of the stake holders to have a sustainable water availibility for the future generations.

The International Conference on Water and Environment, (ICWE), hold in January 1992, in Dublin-Ireland, declared that:

1. Water as the limited and critical sourceses.
2. Development and Management should be performed by participatory approachs.
3. Women will be acts as central point in providing, managing and water conservations effort.
4. Water have an economic and social valuations.

Continued by The Earth Summit, hold in June 1992 in Rio de Janeiro, concluded as The 21st Agenda, with the principles of:

1. That Development Water Resources and Conservation of Environment should be tied accordingly.
2. Poornes Reliefs and Providing Foods will be as priority of the acts

3. Resources, Technology and Skilled will be used for all on the earth.

By the above reasons the Water Resources Development (including mines and water) should be planned, rationally, efficient, optimum, responsible and balance in earth land use, water purposes with other resources in one tied harmonic and dynamic environments.

Compulsory the Earth Summit Development Programme in Indonesia executes through Planning, Developing and Conserving the Resources by integrating and sustainable with three principles:

1. Developments should be based on the ripe planning
2. Implementations should be in the right execution
3. In order to have good quality and efficient in development results, tight supervising should be performed

Constraints in water development programme, faced in:

1. Environmental desecrating
2. Urbanization
3. Industrialization
4. Resources competition using
5. Formulation programme
6. Institution arrangement
7. Resources development mobilization
8. Problems in application of concept of investment development cost recovery.
9. Stressed “Integrated and Sustainable” meaning in the all of Resources Development and Management in National, Regional Programmes
10. Limited of data and informations

In order to implement “the Integrated and Sustainable Water Resources Development and Management Programmes”, the Government of Indonesia gives a National Water Development Strategic Programmes, and should be made applied in:

1. National, Regional and local arrangements of General Spacious Planning.
2. Water Resources Development Planning Arrangement for each River System.
3. Deconcentration and Decentralization Regulations should be delegated to the Local Government.

The policy of “Integrated and Sustainable Water Resources Development Programme” means that all of the stake-holders should involve in developing and using the resources together in order to have quantity and quality of the water balanced with the environment bearing capability toward increasing development in the future needs.

3. Water Resources Development Planning

Basic planning of the development is comprehensive and integrated of the General Spacious Planning with potentially resources in the fields. The main goal of the development is to ensure the integrated allocation and usefull of the resources.

Planning and actual allocation program should be formulated and executed in the physical hydraulic limits in potentialies water of hydrologics, hydrogeographics and hydrogeologics resources in Comprehensive Planning, Long Term Period and based on Cathment Area River System.

Comprehensive Water Resources Development Palnning include the efforts of:

1. Optimize Usefullness and Development of the water resources.

2. Providing Potentially Water Availabilities for domestic and industrial needs.
3. Chance usefulness of water allocation impartial and spreadly.
4. Optimum usefulness of water resources for electric power and others use.
5. Water pollution control
6. Fish productivity and aquatic-cultures based on environments understanding.
7. Flood Controls
8. Environment Control desecrating and Impacts Assesment

In explicit meanings the Water Resources Development activities could be as follows:

1. Conservation efforts: to eliminate erosion and sedimentation, as the result of Indonesia situated in the tropical zone.
2. Construction of structural measures: by Developing Water Resources Planning and Design involving experts.
3. Non-Structural measures (Vegetations): covering the earth surface by vegetations in order to avoid defects caused by wheathering.
4. Budgeting: planning priority for feeding and living people and improving poorness.
5. Executing: involving all the stake-holders and possible involving NGO, privates, etc.
6. Poeration & Maintenance: mainly done by Government, but in this case still facing too many overlap-regulations and lag of coordination.
7. Production Benefiary: investments in Water Resources Development should get the economic beneficiaries and others facilities.

All the mentioned above has already accommodated in the Act no.7 year 2004, but the implementation still far away from the hopes. Through effective Training Programmes in the Local Governmental level will ensure to fulfill the technical, managerial and professional skillnes executors in Water Resources Development.

4. Improvements Programme in Water Resources Development

4.1. River System Compiling

Will be executed due the three main criteriums:

- 1) Relation hydrologics, hydrogeographics and hydrogeologics of water resources in Comprehensive Planning, Long Term Period based on the geophysical and topographical in the Administration Area.
- 2) Related in Adminstration Area means due to the right and authority of the sectoral institutions administrations upon the river system.
- 3) Related in Planning means coordination and integration planning in the administration area.

4.2. Approach paterm to safe water

As we know that the usefulness of water in Indonesia is just 1% of the whole potentially renewable water, with many area is in the status of over-critical balance, which means the that supply is lower than demands. Lacks of water not only due to the ammount but also due to the quality of water caused by uncontrolled desecrations.

Ones of the efforts to solve these problem is by increasing efficiency through controlling the demands and supplies by the approach paterm to save water, using the:

Strategy, Policy Statement, Terchnology, Refunctioning Institutions, Management and Community Participations.

4.3. Water Resources Mapping

Waters which are coming from the hydrologics, hydrogeographics and hydrogeologics resources should be mapped and showed clearly in each boundaries of Catchment Area and also zone of the existence of potentially underground water.

- 1) Mapping of water resources will be included the average of weekly discharges, discharges with return certain period, potentially ground water discharges, the quality, minerals and microbiology contents, etc.
- 2) Dscribes the needs of water allocation for irrigation, industrial, domestics use and others.
- 3) Describes potentially water usefullness for the purposes include future economic considerations.

Discusing the purposes of usefulness and mapping of water resources should be involving all of the stake-holders in each regions or catchment areas, with possibility developing the water resources development for any bussines of water.

4.4. Implementation Strategic in Water Resources Development

The strategics execution points in water resources development programme, are:

- 1) Should be based on planning which is allocation of water usefullnes should be formulated and executed in the physical hydraulic limits from the sources water of hydrologics, hydrogeographics and hydrogeologics.
- 2) Department of Public Works possibly to delegate the execution of the works to State Corporations, while technicsl assistant will be given by the Directorate General of Water Resources Development.
- 3) Execution of the works should be done by “ dynamic integrated approaches”, considering time, location, quantity, quality and the resources availibilities.
- 4) Need skilled persons, capable to treat against problems in the aspect of “integrated and sustainable” management porgramme. Indeed need a training programmes in all levels.

4.5. “Integrated and Sustainable” in Water Resources Development

In principle the policy of Water Resources Development should be proceed Integrated (hold all the needs of stake-holders) in order to have quantity and quality of water balanced with potentially water availibilities in the next future (sustainable).

Development of water resources will consider of usefulness for the people surrounding the areas in the aspects of physically, non-phisically, technically, non-structural, etc. to the optimum usefull.

4.6. Results of Water Resources Development

Coordination programme in between stake-holders to discuss the usefullness of water and stressing in detail analysis should be done in case of:

- 1) Needs of water: the quantities of water that will be used by each stake-holder (domestic, irrigation, industry, plantation, waste city flushing, etc. will be calculated in needs to the next future , considering the increments of population and supporting facilities.

- 2) Potentially water availability: inventory and calculation, done by the experts toward the potentially resources in term of Planning and Development Study using philosophy of civil engineering.
- 3) Implementation: by comprehensive planning and design for physical and non-physical measures of water resources development, execution of the works using qualified constructions that hopes structures will be in long term period of good functions.
- 4) Physical Structures: are the structures facility such as Dam, Reservoir, Weir, Deep Well, Pumping Facilities, Distribution Facilities, Opportunance Works, Sediment Checks, etc. will be as domain of civil engineering.
- 5) Non Physical Structures: all the activities in order to get participation by stake-holder to know and understand the means of water resources development, implemented by brosur, discussion, public gathering, meeting, etc. will be as conservation socialization programmes.

4.7. Unexpected Facts on Irrigation system

- *Coordination among stake-holders in planning & programming of water uses to be integrated & sustainable (almost) NEVER done in the implementation works.*
- Confused in usefulness of the three water resources
- No rehabilitation or improvement works of irrigation structures due to sedimentation that causing degradation in functions.

5. Flood Controls

At time being, (as my supposed) there is one principle of Flood Control Management, missed to be implemented in palnning, design including in execution in the field. It can be discussed here:

5.1. River System

As we know that the River Systems would be consist of *collecting sub-system, transporting sub-system and dispersal sub system* as one tied of systems.

Collecting sub-system, as an area where precipitation is caught and accumulated as run off, flowing to the rive as river discharge. Hydrographs known as a result of the analysis discharges and will use to calculate the dimension of the river or drainage channels with their fuction as for transporting sub-system. Then the water discharges disperse to the sea through the part end of river known as dispersal sub system. River sub-systems have a specific fuctions and problems in connection with hydrological cyclus, there are precipitations, run-off coefficient, river discharges, erosion, sediment and sedimentation along the river up to river mouth, river mouth barrier, wave and tidal influences, etc. as the problems on the river system that could be known due to the flood control matters. From that's points flood control should be taken into account to have the right solutions for each sub-systems by Watershed Management, Flood Control Engineering and River & Coastal Engineering correspondly.

5.2. Priciple Concepts of Flood Control

Flood control means controls to the water discharges which is flowing over the capacities of drainage channel or river profiles. There are many causes such as degradagations of the river profiles by sedimentation, human behavior, over discharges, etc.

River discharge comes from the rain as a result of hydrological cyclus. Therefore flood Control concept should be based on hydrological cyclus and would be solved specifically according to sub-systems of the river.

In the area of collecting sub-system, considering the condition of earth surfaces, discharges can be calculated specifically as discharge with certain return period. During the rainfall and running off, erosion of the earth particles occur and flowing to river, parts sedimented along the river and dominantly sedimented in the river mouth. Analysis of discharges and sediment discharges as for drainage channels dimensions providing, degradation along the river and drainage channels and river mouth sedimentation, all will be used for flood controls planning and design.

5.3. Flood Control Programme

Could be implemented by two methods, are:

- 1) Discharge control: stressed to regulate the discharge from the point mass of water, which would be discharges into the programmed drainage channels. A new drainage channel, short cut, flood way, retarding bazin, retentions bazin including the opportunance works could be made in these programme.
- 2) River course improvement: stressed to improve the existing river courses dimensions to be normalized for flood dischsrges. The most importance thing to be informed here is normalization along the river channel including the river mouth because river mouth is still part of the river overall.

Mostly combination of both methods are applied by the authority as the most economics and existing condition reasons.

5.4. Missing Implementation Concept of Flood Control

Based on the metioned above and due to the writer experiences as the staff of the Public Works Department involving in planning, designing and executing the flood control projects it can be mentioned that almost in the river course improvement project not considering to normalize the river mouth from sedimentation by right concept of flood control programme. Theese pointed by no protection measure concepts against river mouth sedimentation. The effects of these problems, we can understand that flooding occur everywhere mostly in flat areas such as Jakarta, Semarang, pantura etc.

5.5. Results of Flood Control Implementation Programme

From the descriptions of flood control management above that dispersal sub-system of the river system should and have to be included in the planning and design for flood control projects. The constraints of estuaries conditions (in dispersal sub-system) such as at time being has already “owned by real eatate private companies” and others usefullness, is needed to take back, at least for flood control programme, or manage together for flood controls by dredging or other solutions and soil cutting could be used for reclamations as for realty developments.

5.6. Unexpected of Facts on Flood Control

1. Flood Control projects implemented still not using (without considering) the philosophy of hydrologic cycles, which is basically manage of water and alluvial sediment and wave and tidal movements.
2. Solution in the dispersal subsystem (as part of river system) to remove sedimentation to get a proper dimension of river never thought and did by the official.
3. Comprehensive Flood Control considered land subsidence also need to be used indeed, especially in lowland or alluvial plane area.

6. Conclusions and Recommendation

a. Conclusions:

Act no.7 year 2004 it is really good and proper to be applied in “Intergrated and Sustainable Water Resources Development” which are mostly consist of regulations the water usefulness for tht human live for all generations and the other is to protect of human live against the destructives behavior of floods, but the implementations should be completed as well as purposed.

b. Recommendations

- 1) Implemmentation of the water resources development in planning, design and executions need participation and involment all of the stake-holders considering the present and future needs due the increasing human population and facility of water availibilties.
- 2) Flood Control Programme should be in comprehensive planning, design and implementation concepts according to the real philosophy of river systems and hydrological cyclus. Involment of the experts are needed in these case and should be taken into account to have the right solutions for each sub-systems by Watershed Management, Flood Control Engineering and River & Coastal Engineering correspondly.
- 3) Forgeted about budget, because it is realized that these programme need a lot of fund, but technically should be on the right track.

Thank you