Budget

The cost can access needed costs by the NTB provincial government in launching the concept of "earth with a million cattle" that is considered to help fulfilling cattle need in Indonesia and support to meet the national self-sufficient program in 2014. Earth with a million cattle is a flagship program of NTB Governor, Muhammad Zainul Majdi, and his Deputy, Badrul Munir. Data from the Office of Animal Husbandry and Health said that cattle population is about 546,114 by 2008 with the percentage of parent cow of about 37.36% from the population. The birth rate reaches 66.7% of the total parents with the calf mortality of about 20% of all born calf. The recent population of calf is 101,239 with the total slaughter of productive female cattle is not more than 20% of all cattle slaughtered. In NTB, the total slaughtered cattle is of about 41,575 and cattle that are sent out of NTB reaches 28,500.

In accordance to the PSDS 2014, the Directorate General of Animal Husbandry in collaboration with the Central Bureau of Statistics will record over centers of cattle breeding in Indonesia to update the data. Cattle that will be recorded is that afforded by households and legal entities, whose purpose is for business, trade, and transportation. Data collection conducted in this year (2012) is not the first time data collection. Previously, the government has had a cattle population data obtained from cattle census in the past years. Updating the cow data only renew the PTS (cattle keepers) database by visiting the owner of livestock.

NTB provincial government which is as one of cow breeding centers as seen in the national map of local cattle seeds source of in Indonesia (Table A-4) has also launched a concept of Earth With a Million Cattle that was approved by the President of Indonesia. However, this concept will be a cooperation work between Australian Government with local government of NTB province.

Table A- 7 Sources of local cattle breeders in Indonesia

No.	Type of Local Cattle	Breeding Location
1.	Bali	Bali, NTB,Kalsel,Sulbar, Sulsel,Sultra,Gorontalo
2.	Cattle of PO	Sumut, Jabar, Jateng, Jatim,Sulut
3.	Cattle of Madura	Madura
4.	Cattle of Aceh	Aceh
5.	Cattle of Coasal area	Sumbar
6.	Cattle of Bali dan PO	Sumsel , Lampung dan Sulteng
7.	Cattle of PO dan SO	NTT

Sources: Directorate of Breeding, Directorate General of Animal Husbandry

Annex 3.2. Project Ideas for Water Resources

a. Project idea for rain harvesting technology via reservoir

Objective:

To extend water availability for agricultural needs at the dry area by implementing rain harvesting system

Introduction

The occurrence of droughts and floods that are becoming more frequent nowadays causes an impact as well as difficulties in predicting the agricultural season and clean water supply. Meanwhile, the tremendous pressure by population growth to global climate change causes the destruction of forests and uncertainty of hydrological cycle. An indicator of that is the water discharge of the river had decreased sharply in the dry season, while in the rainy season the it sharply increases. The low absorption and storage capacity of water in the watershed cause the supply of water for agriculture mostly is uncertain. This condition is exacerbated by the drought due to selection of commodities that do not correspond to the ability of the water supply. To cope with the drought, one of the least expensive, fast and effective strategies and immediate visible results is to harvest the rain water runoff during the rainy season through water harvesting pond. This technology has been growing very rapidly and widely not only in developed countries such as Europe, America and Australia, but also in countries such as China where densely populated and widespread ownership of land is very limited. Water harvesting efforts accompanied by increasing ground water in rivers, reservoirs and lakes will be able to maintain the supply of water resources for agricultural, domestic, municipal and industrial demand. One effort is to take an advantage of rainwater overflow through building ponds (onfarm reservoirs).

Theoritically, with an annual rainfall average of 2,779 mm (Las et al,1997) logically Indonesia will not be short of water during the dry season. With a population of 206,264,595 people (BPS, 1997), per capita of Indonesian people obtains the water by 71 million liters per day, but it can only be used 0.28% of the existing rainwater. This shows that Indonesia is still lack of water storage technologies. For example, the USA is able to utilize rain water by 8.1% of the existing rain water. Indonesia needs to work hard to create a rain water harvesting technology to fulfill water demand for its people.

The concrete action plan for adaptation to climate change of water resource sector with rain water harvesting technology is to make a pilot plant of rainwater harvesting reservoir which will be equipped with water treatment facilities. Water harvested in the reservoirs is expected to serve the needs of the local community. The pilot plant will be built in the area that has major problem of water supply such as in Gunung Kidul and Nusa Tenggara Timur.

Goals of the Project

The main objective of the project is to

- Provide a rainwater harvesting pilot project which employs a rainwater reservoir with the capacity of 100,000 m3. This reservoir is equipped with a moderate water treatment facility. It is hoped that this pilot rainwater reservoir project can serve as a model for rainwater harvesting projects in other regions.
- Achievement of excellent and sustainable operation of the pilot rainwater harvesting facility.
- Improvement of the living condition of the people benefiting from the rainwater harvesting system.

Methods

The construction method of pond pilot plant involves site selection, coordination measurement, design, construction, and training for ponds operation. The criteria of ponds location is dry land farming, horticulture or animal husbandry which require a supply of water from the ponds as irrigation water. The area is also very deep soil water. There are sources of water that can be accommodated either in the form of rain, surface runoff and spring water or ditches or streams. Its upper region has a catchment area or areas that have water sources to be incorporated into the ponds, such as springs, streams or ditches, and so forth.

The data collected includes the geographic coordinates of latitude and longitude altitude locations using Global Positioning System (GPS) or by extrapolation of available topographic maps. These wells coordinate data that are needed to compile the database system of land management and water as well as monitoring the performance of the implementation of activities that have been run. As preparation for the construction of ponds, its design needs to be made. Designs can be simple in order to be read by the executor in the field. In preparing the design the following steps must be done.

- Conduct field observations to determine the construction of ponds that will best suit local site conditions. For example, in porous soil conditions, the wall of the pond must be stronger and waterproof.
- Determine the geographical location of ponds. In determining the location of ponds should be considered the position and area of cropping land, water source location, height and slope of the land. Location of ponds should be higher than that of farm land and the drainage of water into the distribution of agricultural land/ farm can be done with a gravity system.
- The candidate area of ponds should be rain water catchment areas, the surface flow can be directed into ponds.

Construction of ponds made by the appointed executors has to be carried out intensively. Monitoring and evaluation activities conducted on the overall development of ponds include planning, implementation and control, namely:

- Planning activities include, among others, site selection, socialization, financial plan, support from local government and others.
- The implementation of activities include preparation, planning activities, organization, duties and functions of executive, procurement and use of materials/ equipment, implementation of physical activity, productivity and other work.
- To the control and supervision of the role includes supervision, technical implementation and deodorized physical work.

Operation and maintenance of ponds that have been developed by the farmer / farmer group management ponds. Use of water ponds is done by making Network / Channels Water to farm land or to the public.

To maintain the sustainability of ponds, there are several components that need attention for maintenance that include:

- Reduce water loss through evaporation.
- Maintain/ protect ponds with fencing, removal of silt, repairing a leaking dike and do not throw garbage into the ponds.

Expected results

The expected results of the pilot development of these ponds is obtained 'embung' model that can operate in a sustainable and managable by the community. Demonstration ponds are equipped with a simple water treatment facility that can improve water quality of ponds. By increasing water quality, people can use water ponds as raw water for their water supply in times of crisis. 'Embung' pilot will use a more robust technology that can hold not much water to seep into the ground. This pilot is expected to be disseminated to other areas that have clean water crisis.

Phase of Activity

First year

- Identification of total number of rainwater reservoirs required throughout regions in Indonesia.
- Prioritization of regions in dire need of rainwater reservoirs.
- Determining a region which has a great potential for becoming the site where the pilot rainwater reservoir installation project will be taking place (remote island or barren land would be favorable), such as the Province of East Nusa Tenggara.
- Preparation of the location of the rainwater reservoir installation.
  - Hydrological/geohydrological examination
  - Geological examination
  - Examination of soil structure/ sustaining capacity
  - Examination of usage
  - Examination of capacity determination
  - Examination of rainwater harvesting technology implementation
  - Examination of environmental impact
  - Technical examination of rainwater reservoir installation planning
  - Financial examination of the rainwater reservoir installation

Dissemination of the rainwater reservoir installation plan

- Urgency of rainwater reservoir installation
- Benefits of the rainwater reservoir for the future
- Land requirement
- Sustainable rainwater reservoir maintenance

Second year

1) The rainwater reservoir installation
   - Land acquisition
   - Preparation of the location and field workers
   - Supply of materials and equipments
   - Rainwater reservoir installation

2) Initial operation of the rainwater reservoir
   - Water filling
   - Leakage test
   - Training for the rainwater reservoir operators

Third year

1) Monitoring and mentoring during the initial operation of the rainwater reservoir.
2) Official opening ceremony and handling of the rainwater harvesting facility to the regional government.

Budget

In the construction phase of ponds need for socialization, land replacement, the construction itself, the initial operation until the handover to the people who will manage the ponds. The proposed pilot ponds here have 100.000 m3 volum per day. If the average depth is 8 m, then the area required for the manufacture of ponds is around 15.000 m2.

Total cost of the starting phase of socialization required for managing ponds is estimated at USD 8 billion. The cost of construction of the ponds pilot is obtained by grant assistance of foreign aid.

b. Project ideas for waste water recycling technology

Objective: to increase the availability of clean water through a recycling process of the domestic wastewater by applying of ultrafiltration and reverse osmosis membranes processes

Introduction

Reuse of domestic wastewater has been occurring for a long time. However, planned wastewater reuse has being gained importance for only the last couple decades, as the demands for water has dramatically increased due to technological advancement, population growth, and urbanization, which impact on the natural water cycle. Reuse of wastewater, which consumes limited fresh water, will actually imitate the natural water cycle via engineered processes. This treatment has been done confidently for the safe reuse of reclaimed water for beneficial uses. The main reuse is commonly for agricultural and non-potable reuses. There are also many projects that have proved to be successful for indirect or direct potable reuse. Thus, the potential wastewater has to serve as a viable alternative source of water, in future.

Historically, water management has focused on building dams, reservoirs, and diversion canals etc., to make available water wherever needed, and in whatever amount desired. Soaring demands due to rapidly expanding population, industrial expansion, and the need to expand irrigated agriculture, were met by ever larger dams and diversion projects. Dams, river diversions, and irrigation schemes affected both water quality and quantity. Demands on water resources for household, commercial, industrial, and agricultural purposes are increasing greatly. In Indonesia, the populations are growing while water availability is getting scarcity. More than half of the populations have low to very low water availability, and quality of water has also been the key issue for this low water availability. In addition, the rapid spread of water pollution, the links between quantity and quality of water supplies have become more