



Department of Agriculture  
**BUREAU OF SOILS AND  
WATER MANAGEMENT**

*Success Stories*  
*on the Various*  
*Projects and*  
*Researches*

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## In the Area of Natural Resources Development and Management



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## Implementation of Small Water Impounding Project (SWIP), Small Diversion Dams (SDD), Small Farm Reservoir (SFR) and Shallow Tubewells (STW)

### DEFINITION

**SWIP**— a structure constructed across a narrow depression or valley to hold back water and develop a reservoir that will store rainfall and run-off during the rainy season for immediate or future use.

**SFR**— a small water impounding dam structure to collect rainfall and run-off, designed for use in a single farm and typically has an area of about 300 to 2,000 sq.m. The embankment height above ground level is less than 4 m. It can easily be constructed manual digging or through a bulldozer. Irrigation is done with the use of a PVC siphon pipes or pumps.



**SDD**— A concrete or rock fill structure constructed across a channel or river with continuous flow to raise the water level and allows diversion of water by gravity from the source to the point of use.

**STW**— is a tube or pipe vertically set into the ground at depth of 20 to 60 feet for the purpose of suction lifting of water from shallow aquifers. The tube or pipe is usually a 3” to 4” diameter schedule 40G.I. Pipe. It consists of one or more fully developed shallow tubewell equipped with appropriate pumping units that can serve a contiguous area owned by an individual or groups of farmers. The pumping unit consists of a centrifugal pump powered by a 5 - 10 diesel engine or electric motor.

### PURPOSE

#### SWIP, SFR and SDD

- Minimize soil erosion, siltation and flooding

- Improve hydrological condition
- Provide supplemental water for crop intensification and diversification
- Improve the living condition of upland rural communities

### STW

- To utilize and manage potential shallow aquifer to augment surface water in providing adequate water for sustained productivity.

## IMPACT

### SWIP, SDD, SFR

#### General

- Optimum use of shallow groundwater for the provision of adequate soil moisture for the improvement of crop
- Soil productivity improvement
- Food supply

#### Specific

- Local self-sufficiency in food is strengthened or assured
  - ⇒ Provide additional production areas of **172,020** hectares
  - ⇒ Increased production in the upland communities by about **946,055** tons (or **586,572** tons of milled rice) providing food to **4,888,100** persons or **977,620** upland families annually.
  - ⇒ Introduced inland fishery benefits equivalent to a total of **2,304** tons of *tilapia* annually providing the fish requirements of **82,950** persons or **16,590** upland families.
- Strengthened and supported the implementation of devolution
  - ⇒ Cost-sharing by the Local Government Units (LGUs) which creates a strong partnership with the local government in view of accountability.

- ⇒ Creates local constituency for a national program.
- ⇒ Ensures LGU's involvement in the operation & maintenance of the systems.

- Improved socio-economic conditions of upland rural communities
  - ⇒ Increased farm income through crops and fishery benefits
  - ⇒ Location serves as recreational facilities to about **6,900** upland families
- Reduces flooding and siltation of low lying areas.
- Recharged groundwater and improved water supply.

### STW

- Crop intensification and diversification.
- Provides soil moisture in areas not serviced by any irrigation systems or at the tail-end of NIA's system.
- Improved farm income.

## BENEFICIARIES

### SWIPs, DDs

- Group of marginal upland farmers not traditionally served by public infrastructures.
- More than **28,000** farmers are served nationwide.

### SFR

- More than **14,000** individual farm holders in the uplands

### STW

About **25,000** group of individual farmers at the tail end portion of existing service are of the National Irrigation Administration (NIA) and in areas not served by other irrigation systems.

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## In the Area of Sustainable Productivity



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## Balanced Fertilization Strategy (BFS)

### DEFINITION

**BFS** - the implementation of Presidential Proclamation No. 1071 which recognizes the value of combining organic and inorganic fertilizers in increasing rice production and in improving the quality of the soil and groundwater.

### PURPOSE

- To formulate location-specific fertilizer formula providing the optimal combination of organic and inorganic fertilizers.
- To illustrate the efficacy of the Balanced Fertilization Strategy.

### IMPACT

- Increased yield of rice to at least **5.0** tons per hectare or at least 1.0 ton of incremental yield over the yield of the best farmer in the area.
- Rehabilitation of the degraded lowland soils (e.g. improvement of soil organic matter over time) in the area.
- Increased farm income.
- Minimized water pollution and increased soil biodiversity.
- Increased awareness of the technicians, farmers and stakeholders on the value of location-specific organic-based fertilization in soil and plant nutrition.
- Identification of micronutrient deficient areas and test the efficacy of the value of micronutrient (Zinc) in areas where traditional fertilizer application did not improve crop yields.



### BENEFICIARIES

**25,131** of additional persons with sustained supply of rice.

# Land Use Planning and Decision-Making



## Strategic Agriculture and Fishery Development Zones (SAFDZ)

### DEFINITION

*Legal (RA 8435)*

- Refers to areas within the Network of Protected Areas for Agriculture and Agro-Industrial Development (NPAAAD) identified for production, agro-processing and marketing activities to help develop and modernize the agriculture and fishery sectors, with the support of the government, in an environmentally and socio-culturally sound manner.

*Operational*

- Refers to prime agricultural lands selected from strategically located areas within the NPAAAD which are actively used for agricultural and fishery production/ whose support facilities are available and strategically located to warrant full modernization of agriculture.

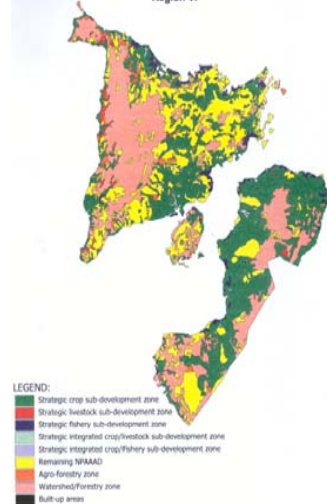
### PURPOSE

- To rationalize the allocation and use of the remaining and available agricultural lands in the country.
- To set aside strategically-located prime lands for the modernization of agriculture and fishery sectors.

### IMPACT

- Institutionalize the assignments of Strategic Agriculture and Fishery Development Zones (SAFDZ)
- Creation of nationwide awareness and common understanding on the value of

Strategic Agriculture and Fisheries Development Zone  
Region VI

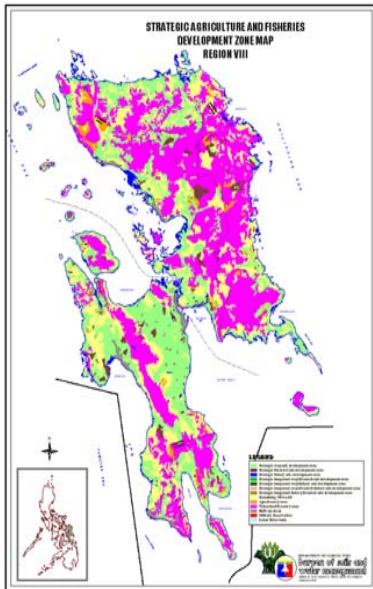


- identifying and preserving agricultural lands for food security
- Provided physical basis for a national agriculture development and infrastructure investments
- Provided basis for the estimation on the food supply and capacity of all the municipalities and provinces in the country.

### BENEFICIARIES

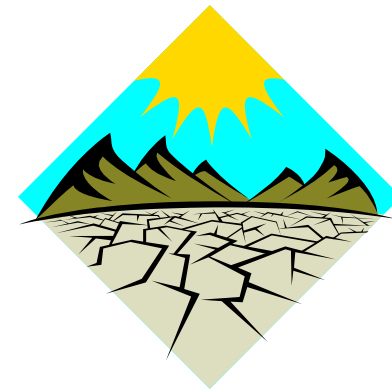
- All Local Government Units (LGUs),, farmers and potential investors

### ACCOMPLISHMENTS



To date, the BSWM has completed the preparation of the SAFDZ maps at the municipal level. 70% of these have already been validated by the concerned LGUs and are made ready for reproduction. All these outputs were generated despite the constraints in both financial and manpower resources as well as the formal organizational/ committee structures required in the implementation of the mapping activity.

## Drought Mitigation Measures



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## Cloudseeding

### DEFINITION

**Cloudseeding** is a technology that dispense chemicals in the clouds to hasten the coalescence/ collision of cloud particles. As the combined particles increase in size and become heavy, it turns into water droplets and fall down as rain. Cloudseeding is undertaken with the use of an aircraft equipped with special chemical dispensing facility. Cumulus of cumulonimbus (*cauliflower-like*) clouds are the appropriate clouds for seeding purposes. These are usually located within an altitude of almost 11,000 ft.



### PURPOSE

- To offset the effects of an extended dry spell by inducing rain in agricultural areas and critical watersheds that serve as the source of water for multi-purpose dams.

### IMPACT

- The timely intervention of cloudseeding in major agricultural areas and watersheds of the country significantly minimized the devastating effects of the recent El Niño phenomenon on the agriculture sector of the country. Likewise, the decreasing water level of Angat Dam that provided the domestic water requirements of Metro Manila was checked/ slowed down. The effectiveness of the intervention was through the coordination with the DA-RFUs, concerned LGUs and NGOs.

### BENEFICIARIES

Approximately **1,246,680** hectares of agricultural crops (mostly rice

and corn) benefited from the operation. The decreasing water level of Angat Dam was also minimized.

## Shallow Tubewell (STW)

### DEFINITION

**STW** - utilization and management of shallow aquifers to provide soil moisture for crop production during El Niño years. It is not recommended for domestic use due to its exposure to high risk contamination.



### PURPOSE

- To utilize and manage potential shallow aquifer to augment surface water in providing adequate water for sustained productivity.

### IMPACT

- Mitigate effects of El Niño
- Provides soil moisture in areas not serviced by the National

Irrigation Administration

- Strengthened linkage with other concerned agencies

### BENEFICIARIES

About 16,000 group or individual farmers at the tail end portion of existing service area of NIA and in areas not served by other public infrastructure.



# Research Breakthroughs



## Phosphorous (P) Uptake Mechanisms of Legume Crops in an *Ultisol*

### BACKGROUND

*Ultisols* are infertile soils characterized by low organic matter content and available Phosphorous (P) and its exchangeable cations. The search for the exploitation of crops that are able to utilize less available nutrients is one strategy to improve sustainability of agriculture in marginal lands. In this connection, screening crops for their ability to absorb P under P-limiting conditions is of great significance, especially because of the high cost of P fertilizer.



Legumes are particularly important crop in low fertility soils such as *Ultisols* due to their protein content and ability to fix atmospheric nitrogen. When used as green manure, it serves as excellent Nitrogen sources for the succeeding non-legume crops. The researchers observed that peanut residues gave better yield on green corn

than sesbania and cowpea.

### PURPOSE

- To investigate the nutritional uptake mechanisms of legume crops I.e. peanut in an *Ultisol*

### IMPACT

- Identification of peanuts as alternative material for green manure and composting.
- Discovery of peanut as having the highest ability to solubilize native Phosphorous (P) which are otherwise available to infertile acid soils.

This outstanding characteristic of peanut with reference to soil P uptake indicate the value of peanut for green manure which supplied the needed Phosphorous (P) without having the danger of fixation.



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## Design and Fabrication of Run-Off Mechanical Recorder

### DEFINITION

**Run-off Mechanical Recorder** is a triangular tipping bucket type, double container with divider having a mechanical counter attachment and other parts, which is intended to measure the run-off or erosion. This bucket can be fabricated using a galvanized iron or an acrylic sheet. The run-off volume that can fill the tipping bucket will depend on the plot area, maximum rainfall intensity and expected run-off.



### PURPOSE

To quantify run-off under given bio-physical conditions including soil erosion where this instrument is attached to the sediment trap with the use of low-cost materials thus, avoiding the use of expensive and imported instruments (run-off measuring device).

### IMPACT

- High percentage of performance accuracy was obtained during the calibration posing no danger of overflowing as water is discharged in the tipping bucket before its full capacity.
- The instrument can be locally manufactured at the cost of as low as P 2,656.00 compared to its imported version which costs Y 300,000. Installed in the experimental plots of Soil Conservation Researches at the BSWM's National Soil and Water Resources Research Center in Tanay, Rizal. Its impact was further confirmed when it won the Best Paper Award during the Research & Development Evaluation Workshop held in May 1998.
- Introduced in JIRCAS Ishigaki, Okinawa in Japan last September, 1998 for monitoring run-off and was accepted and recognized by Japanese scientists.

### BENEFICIARIES

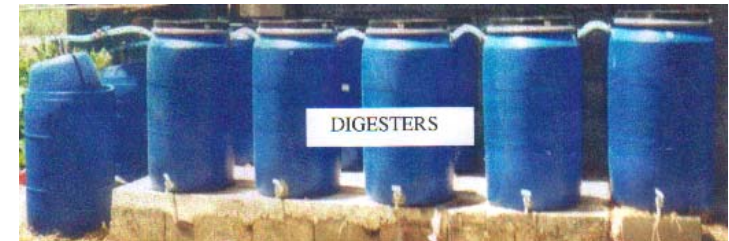
Government Research Institutes, State Colleges and Universities — both local and international.

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## BioGas, Compost and Liquid Fertilizer (BioCLF)

### DEFINITION

*BioGas, Compost and Liquid Fertilizer* is a technology for farm waste utilization and management wherein farm wastes specifically crop residues are recycled and utilized for various purposes.



### PURPOSE

The *BioCLF* involves farm wastes recycling, specifically crop residues, methane mitigation and supports organic-based farming.

### IMPACT

- Minimize the burning of agricultural crop residues such as rice straw, corn husks and cobs, and others.
- A source of organic fertilizer in both compost and liquid forms that could enhance soil productivity.
- Reduces methane (CH<sub>4</sub>) emission to the atmosphere since the biogas formed through anaerobic decomposition can be used for cooking.
- Paved the way to the design of a Portable BioGas Generator called PortaGas.

### BENEFICIARIES

Farmers and rural folks.

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## Rapid Soil Testing (RST)

### DEFINITION

**Rapid Soil Testing or RST** is a portable soil testing kits that quickly identify macro and micronutrient problems ( such as soil pH, N, P, K, and zinc deficiencies, etc) of the soil, thereby. determine location-specific fertilizer requirements of an area.



### PURPOSE

- To provide quick field analysis for macro and micro nutrients of the soil.
- To help sustain the nutrients of the soil and determine the appropriate crops

suitable in a specific area or location.

### IMPACT

- It can provide a direct information about the adequacy and deficiency levels of both the major and minor soil nutrients.
- It can determine the macro and micro nutrients of the soil at a low cost and fastest means.
- It can inform the users of the new analysis requirements to ensure that location-specific fertilizers are recommended.

### BENEFICIARIES

Farmers, agricultural technicians and other end-users.

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## Basket Composting cum Mushroom Production

### DEFINITION

**Basket Composting cum Mushroom Production or BCMP** is a value-added approach to composting and a technology for farm waste utilization and management. Generally, farm wastes of major crops in the



country are improperly disposed and largely unused. The BCMP will provide as an effective alternative to properly utilize and manage farm wastes by using baskets, sacks or plastic bags as containers for easily decomposable farm wastes such as rice straws, corn cobs or husks, banana leaves or stalks and others. As the composting process progresses, mushroom spawns can be planted to the same containers for additional income to farmers.

### PURPOSE

- To encourage farmers to practice composting
- To introduce mushroom production as a value-added component to give additional income to farmers while preparing their own compost.
- To utilize farm wastes and recycle its nutrients.

### IMPACT

- Encourage farmers to practice composting.
- Value-added approach of growing mushrooms while composting.
- Farm waste utilization and management.

### BENEFICIARIES

Farmers and researchers.