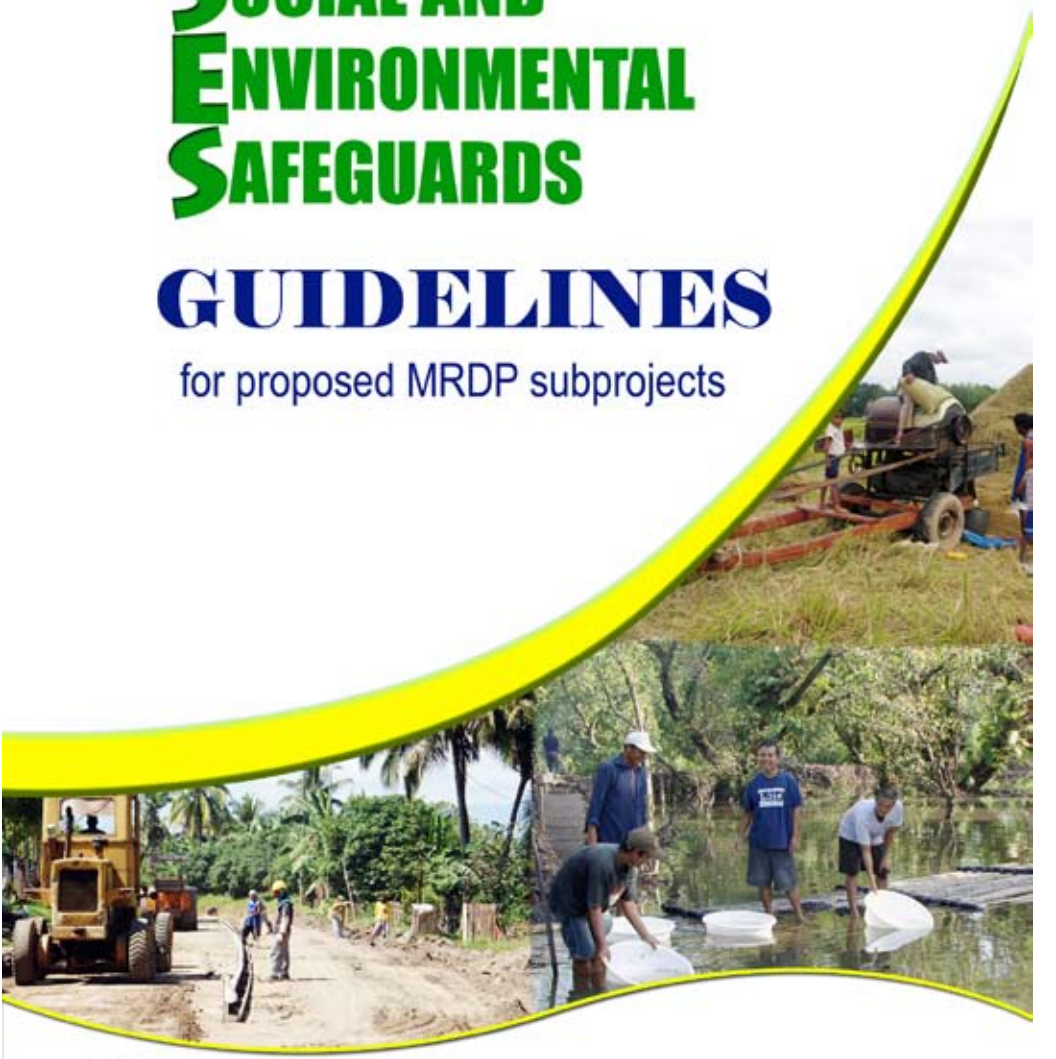
Information Bulletin No. 6/2010

SOCIAL AND ENVIRONMENTAL SAFEGUARDS

GUIDELINES

for proposed MRDP subprojects



Department of Agriculture
MINDANAO RURAL DEVELOPMENT PROGRAM 2

ABOUT MRDP 2

The Mindanao Rural Development Program -
Adaptable Program Loan Phase 2 (MRDP2) continues to implement poverty-reducing interventions in more poor communities across Mindanao as it expands in scope of coverage (225 towns in 26 provinces).

Implemented under the Department of Agriculture, MRDP1 accomplished various projects and provided significant learning experiences on which MRDP2 takes off.

MRDP2 seeks to further improve rural incomes and achieve food security through agri-fisheries infrastructure, livelihood enterprise, and biodiversity conservation projects.

Partnership with LGUs and other national agencies are also forged for laudable impact in Mindano rural communities.

Alongside poverty- reducing initiatives, the Program likewise reinforces the implementation of the Local Government Code and the Agricultural and Fisheries Modernization Act.

Working interdependently to bring development in the countryside are four MRDP components: Rural Infrastructure, Community Fund for Agricultural Development, Natural Resources Management and Investment for Governance Reforms and Program Administration.

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ABOUT SES

The Social and Environmental Safeguards or SES ensures that people and environment are not negatively affected by the subproject implemented by the program.

It is a measure that mitigate and protect the environment from the cumulative adverse effects that might be brought by failure to recognize the inherent value of natural resources.

Its policy framework is in compliance with the World Bank Operation Policy, the Philippine laws particularly anchored on the Indigenous peoples Right Act and other related environmental laws applied in the regions, provinces and municipalities.

Its activities involve rigorous study thorough documentation of existing conditions, identification of impacts, and a comparative examination of impacts arising from infrastructure and livelihood projects.

MRPD Development Frameworks

Land Acquisition, Resettlement and Rehabilitation (LARR)
- to ensure that all displaced persons will be compensated for their losses and provided with assistance to improve, or at least maintain pre-project living standards and income earning capacity.

IP Development Framework - to ensure that IPs will benefit from MRDP and to avoid or mitigate potentially adverse effect on IP caused by subprojects.

Environmental Guidelines - mitigating measures that are meant to strengthen environmental safeguards. They are considered in the design, site selection and implementation of subprojects.

ACRONYMS

APCP	-	Air Pollution Control Device
BOD	-	Biological Oxygen Demand
CENRO	-	Community Environment and Natural Resources Office
CFC	-	Chloro-Flouro-Carbon
DENR	-	Department of Environment and Natural Resources
DOH	-	Department of Health
EMB	-	Environmental Management Bureau
FLA	-	Fishpond Lease Agreement
HACCP	-	Hazard Analysis Critical Control Points
IP	-	Indigenous People
IPM	-	Integrated Pest Management
LGU	-	Local Government Unit
MHO	-	Municipal Helath Office
MRDP	-	Mindanao Rural Development Program
PO	-	People's Organization
PPE	-	Personal Protective Equipment
SALT	-	Sloping Agricultural Land Technology
SMP	-	Survey, Mapping and Planning
STOP	-	Slope Treatment Operating Procedure

RURAL INFRASTRUCTURE

Farm-to-Market Road Rehabilition

Design

1. Adoption of cut-and-load method.
2. Provide the following for control and disposal of water:
   - Provide proper side and cross drainage to prevent future overflow and soil erosion;
   - Protection measures for newly cut slopes and embankments; and
   - Provide sediment traps on side canals during construction.
3. Put in place erosion control measures:
   - Provide drainage control facilities as soon as possible, finishing at the same time of construction; and
   - Roadside channels, cross drains, and drainage structure inlets and outlets shall be designed. If protection is needed, riprap or other similar strategies/materials shall be used.
4. Watercourses and water quality shall be protected during and after construction by erosion-control facilities and maintenance. Filter strips, water and sediment control basins, and other conservation practices shall be used and maintained as needed.
5. Follow natural contours when possible by avoiding deep cuts of soil surfaces and steep slopes.
6. Consider safety entry on public roads.

Site Selection

1. No encroachment in protected areas.
2. No construction in critical slopes.

Implementation

1. Trees, stumps, roots, brush, weeds, and other objectionable material shall be removed from the work area.
2. Grading, sub-grade preparation, and compaction shall be done as needed.
3. Measures must be in place to limit the generation of particulate matter during construction.
4. Considerations for erosion control:
    - Effects on downstream flows or aquifers that would affect other water uses or users;
    - Effects on the volume and timing of downstream flow to prohibit undesirable environmental, social, or economic effects;
    - Short-term and construction-related effects of this practice on the quality of on-site downstream water courses;
    - Overall effects on erosion and the movement of sediment, pathogens, and soluble and sediment-attached substances that would be carried by runoff from construction activities; and,
    - Effects on wetlands and water-related wildlife habitats that would be associated with the practice.
5. Inspect culverts, roadside ditches, water bars and outlets after each major runoff event and restore flow capacity as needed.
6. Minimize the damage to vegetative buffers adjacent to the road when it is necessary to chemically treat the road surface to maintain erosion protection.
7. Fill low areas in travel treads and regrade, as needed, to maintain road cross section.
8. Inspect roads with water-bars periodically to insure proper cross section is available and outlets are stable.
9. Conservation practices that limit particulate matter emissions should be incorporated into long-term maintenance plans.
10. There shall be no cutting of big trees located within the right-of-way without prior coordination with CENRO concern.

Design

1. Irrigation storage reservoirs shall be designed to satisfy irrigation requirements in the design area, unless limited by reservoir site characteristics, available watershed yield, or limitations imposed by water rights.
2. Additional capacity shall be provided as needed for sediment storage. Water releases shall be those increments of the water demand hydrograph that exceed the available direct flows from other sources.
3. The maximum slope in the direction of irrigation if rainfall erosion is not a significant problem shall be as follows:
   - Furrows - 3 percent;
   - Corrugations - 8 percent;
   - Borders for nonsod-forming crops, such as alfalfa or grain - 2 percent; and
   - Borders for erosion-resistant grass or grass legume crops or for nonsod-forming crops on sites where water application by the border method will not be required until after good crop stands have been established - 4 percent.
4. Diversion weir should be provided with fish ladder to enable migratory fishes to move freely upstream-downstream direction unhampered.
5. Provision of silt ejector and silt trap in the reservoir.
6. Trapezoidal canals if land is available. If land is limited, concretize rectangular canals.

Site Selection / Location of Water Source and Weir

1. The amount of water required to meet variations in water demand within the growing season must be determined to calculate storage requirements. All demand hydrographs shall be computed from the consumptive use-time relationship. Demand hydrographs shall be adjusted to reflect anticipated irrigation efficiency, conveyance losses, and any other consumptive uses, such as leaching or frost control.
2. Source of water meets quality standard for irrigation i.e. minimum silt

content and absence of water borne diseases (schistosomiasis, malaria, etc.).
3. Intake point or diversion be outside protected area or critical watershed.
4. Damage/disturbance to ecologically significant flora and fauna be minimal.

Implementation

1. The maintenance on leveled fields includes the periodic removal or grading of mounds and/or depressions. Land grading may periodically be needed to restore the design gradient.
2. Avoid drying up of creek/river downstream.
3. No quarrying within 1 km distance downstream from the weir.
4. Control the use of agrochemicals in service area.
5. Prevent pesticides from going into rivers/creeks.
6. Carefully manage pesticides through IPM programs.
7. Protect canals from livestocks.
8. Avoid stagnant water in the creek/stream to deny mosquitoes of breeding place.
9. An Operation and Maintenance plan shall be prepared for use by the landowner or operator. The plan shall provide specific instructions for operating and maintaining facilities to ensure they function properly. The plan shall include the following provisions:
    - Periodic cleaning and re-grading of collection facilities to maintain proper flow lines and functionality;
    - Periodic checks and removal of debris from trash racks and from inlet and outlet structures to assure proper operation;
    - Periodic removal of sediment to maintain design capacity and efficiency;
    - Routine maintenance of all mechanical components in accordance with the manufacturer's recommendations;
    - Periodic inspection and maintenance of embankments and earth spillways to control erosion and undesirable vegetation;
    - Periodic water quality analysis as necessary to evaluate nutrients, pesticides, and pathogens;
    - Clean or backflush filters when needed;
    - Flush lateral lines regularly;
    - Check applicator discharge often. Replace applicator when necessary;

- Check operating pressures often. A pressure drop (or rise) may indicate problems;
- Check pressure gauges to ensure proper operation. Repair/replace damaged gauges;
- Inject chemicals as required to prevent precipitate buildup and algae growth;
- Check chemical injection equipment regularly to ensure it is operating properly;
- Check and assure proper operation of backflow protection devices.

10. Biological means of stabilizing disturbed slopes/banks of river/creek and primary canals (e.g. vengineering).
11. Maintain forest cover at all times in the watershed.
12. Watershed co-management as joint undertakings of LGU and DENR.
13. If watershed utilization for production cannot be avoided, farmers shall adopt soil conservation measures as described in SALT or STOP methods of crop farming.
14. Monitoring of water quality, operation & maintenance plan, regional water use plans.
15. Provision of corridors of habitats for movement of animals.

Potable Water Supply
(Spring development, deep well)

Design

1. Spring protection:
   - Springs protected from contamination by construction of spring catchments box and other protective measures;
   - Spring box must contain both overflow pipe and cleaning pipe.
2. For deep wells, pumping stations be away from houses:
   - No latrine within 30 meters;
   - No latrine above ground the dug wells;
   - No stagnant water within 2 meters;
   - Must have adequate fencing around wells to prevent animals from entering;
   - Cement floor for well should not be less than 2 meters in diameter.

3. For dug wells:
    - Constructed or deepened on dry season to ensure year round water supply to prevent users from obtaining; contaminated sources;
    - Shaft and pipes must be lined.

Site Selection / Location of Water Source

1. Minimal distance from human settlements, solid waste dumsite, and agricultural area.
   For wells:
    - No well site shall be located within a distance of less than 25 meter radius on flat areas from sewage treatment plant, sewage wet well, sewage pumping station, or a drainage ditch which contains industrial waste discharges or wastes from sewage treatment systems, sanitary landfill or land irrigated by sewage treatment systems, sanitary landfill or land irrigated by sewage treatment effluent, sanitary sewers, septic tanks, cesspools, open-jointed drain-fields, animal feed lots or livestock in pastures, dump grounds, especially in limestone areas. Storm and sanitary sewers located within specified distances shall be constructed as to prevent leakage.
    - The drilling of water well within 50 meter distance from cemetry is prohibited.

   For springs:
    - Washing and bathing within 25 meter radius of the spring is prohibited.
    - No dwellings shall be constructed within the catchment area and it shall be off-limits to people and animals.
    - A drainage ditch located at least 25 meters away on the uphill side of the spring shall be constructed to prevent contamination and flooding of the water source.
2. Water quality certified by DOH.
3. Minimal disturbance of ecosystem if natural spring is tapped for development.
4. Adequate protection from livestock.
5. Water flow from headwater to primary storage site unaffected by human activities.
6. Water discharge adequate for all seasons.

Implementation

1. Community participation to resolve conflict in water use and over exploitation of aquifers.
2. Use of PVC pipes for distribution.
3. Maintenance after every storm:
    - Unless there is automatic way of diverting flush of water from storage tank, disconnect inflow pipe from the tank;
    - Reconnect the pipe 15-20 minutes after the rain begins to fall;
    - Weekly maintenance;
    - Check water level in storage tank using a stick, kept clean and used for any purpose;
    - When water level falls faster than normal there may be a leak. Check tank for wet areas and repair.
4. Monthly maintenance - Clear roof or other collection surface, pipes and gutters of bird droppings, leaves and other wastes.
5. Yearly maintenance:
    - Repair leaks –replaster inside of tanks;
    - Check and repair roof and other collection surfaces, gutters and pipes;
    - Drain tanks and clean out any sediment from the bottom;
    - Disinfect tank with chorine solution;
    - Chlorine residuals maintained at:
        - ✔ All points of piped supply – 0.5 mg/l
        - ✔ At stand posts and wells – 1.0 mg/l
        - ✔ In tanker trucks, at filling – 2.0 mg/l
        - ✔ In areas with low cholera outbreak – 0.2 to 0.5 mg/l at all supply points
6. Monitoring: Bacteriological and physical/chemical analyses:
    - Open wells – monthly
    - Covered dug wells with hand pumps – 2x per annum
    - Springs and piped supplies – 2x per annum
    - Rainwater collection systems – once a year

LIVESTOCK AND CROP PRODUCTION

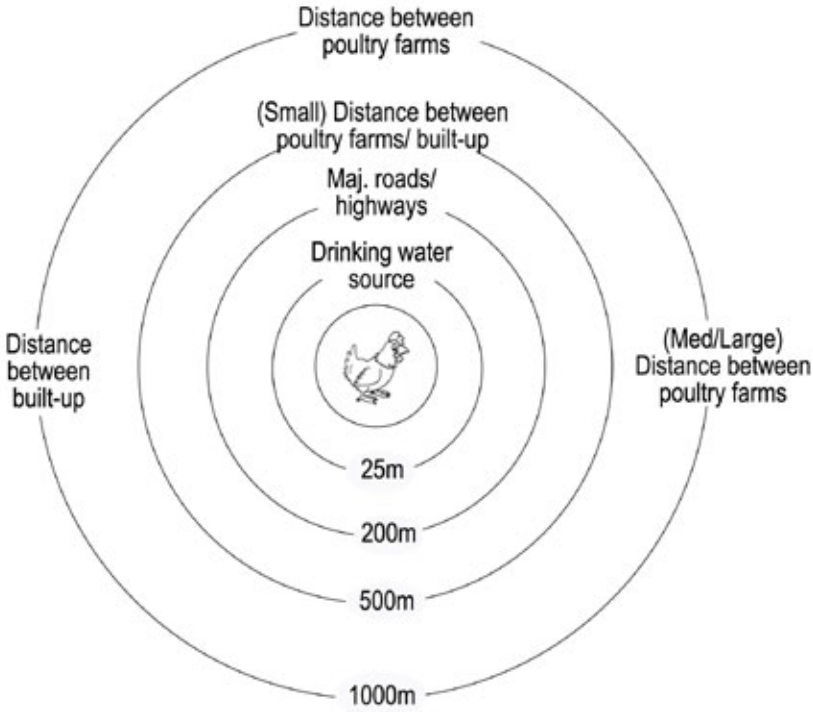
Poultry

Design

1. Basic considerations:
   - Storage capacity to contain at least 180 days;
   - Safety concerns:
     - ✔ Permanent fence at least 1.5 meters high for liquid storage without fixed covers;
     - ✔ Tank covers close to the ground level, 0.6 meter above ground;
     - ✔ Locking devices for covers installed;
     - ✔ Signage –all access points marked with suitable safety signs.
   - Labor efficiencies;
   - Moisture contents of manures;
   - Type of storage facilities – lined when located in porous and permeable soils;
   - Method of collection practiced;
   - Potential nutrient losses – reference to greenhouse gases;
   - Application methods – impacts on soil, water, and air;
   - Odor generation.
2. Adherence to LGU guidelines/permits on specifications relative to this type of project.
3. Poultry house be elevated.
4. Use of indigenous materials, e.g. bamboo for flooring.

Site Selection / Location of Water Source and Weir

1. Situated preferably in a rolling terrain to have good drainage. Flood prone areas, and other environmentally critical areas like watershed, source of water supply, etc. as defined by the EMB shall be avoided.
2. Avoid sites with high moisture level. The soil must be well drained and porous.
3. There shall be a buffer zone of at least 5 meters in width around the boundaries of the lot and shall be planted with trees or shrubs.
4. It shall be located at least 25 meters radius away from sources of ground and surface drinking water.
5. Adequate water supply.
6. Location should conform to the local zoning ordinance (Barangay and Municipal):



Required distances for putting up a poultry.

Classification	Distance from ground water source (m)	Distance from built-up (m)	Distance from Major Rd./ Highway (m)	Distance between poultry farms (m)
Backyard	25	N/A	N/A	N/A
Small	25	500	200	500
Medium	25	1,000	200	1,000
Large	25	1,000	200	1,000

7. Other siting considerations:
    - Avoid sites with permeable soils or fractured bedrock;
    - Maintain recommended property setbacks from water courses, wells, and neighbors;
    - Provide adequate lot slopes on outside lots for surface drainage;
    - Allow space for potential expansion;
    - Wind protection enhances performance; and
    - Ensure upslope runoff is diverted away from the feedlot.

Implementation

1. Construction wastes to be disposed properly.
2. Manure waste to be collected regularly, dried and utilized as organic fertilizer.
3. Best Practices:
    - Outside storage – collect and transfer manure from barn to storage daily;
    - Ensure that sufficient bedding is added to absorb liquids;
    - Maintain water systems to prevent leakage;
    - Use pressure water systems to clean buildings;
    - Clean and disinfect buildings between successive groups of livestock;
    - Keep dusts levels low;
    - Maintain low air flow through buildings;
    - Locate exhaust outlets for maximum air dilution taking advantage of prevailing winds;
    - Maintain recommended animal densities;

- Reduce occasional manure agitation; and
- Reduce movement of odorous air from storage areas to neighboring areas

Piggery

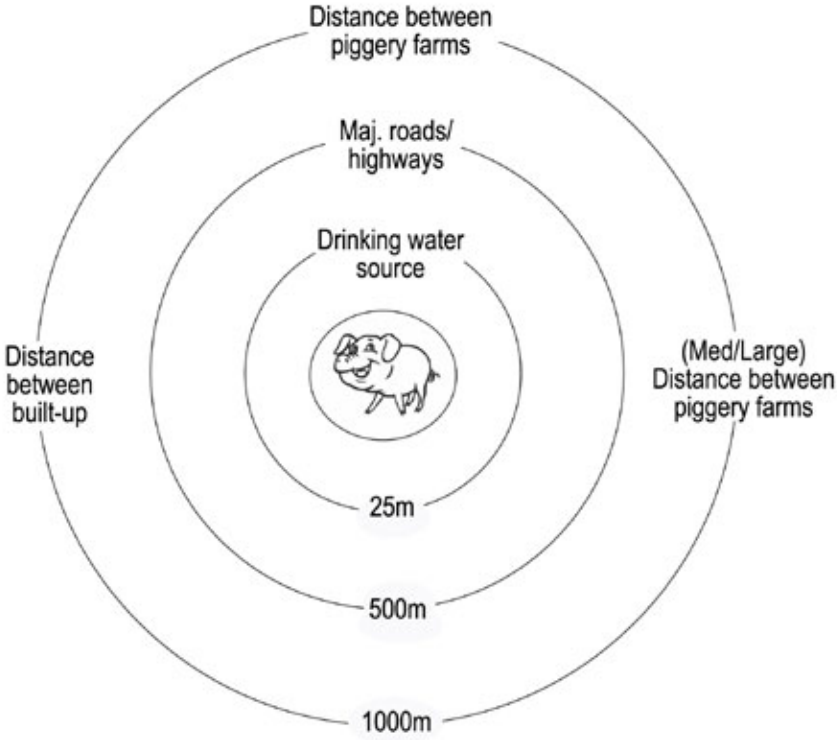
Design

1. Basic considerations:
   - Storage capacity to contain at least 180 days;
   - Safety concerns:
     a Permanent fence at least 1.5 meters high for liquid storage without fixed covers;
     a Tank covers close to the ground level, 0.6 meter above ground;
     a Locking devices for covers installed;
     a Signage – all access points marked with suitable safety signs
   - Labor efficiencies;
   - Moisture contents of manures;
   - Type of storage facilities – lined when located in porous and permeable soils;
   - Method of collection practiced;
   - Potential nutrient losses – reference to greenhouse gases;
   - Application methods – impacts on soil, water, and air.
2. Piggery house flooring concrete; pig pen walls made of horizontally spaced iron bars to ensure proper ventilation.
3. Construction waste materials to be properly disposed of.
4. Secure sanitary permit from Municipal Health Office.

Site Selection / Location of Water Source and Weir

1. Situated preferably in a rolling terrain to have good drainage. Flood prone areas, and other environmentally critical areas like watershed, source of water supply, etc. as defined by the EMB shall be avoided.
2. Avoid sites with high moisture level. The soil must be well drained and porous.

3. There shall be a buffer zone of at least 5 meters in width around the boundaries of the lot and shall be planted with trees or shrubs.
4. Location shall be 25 meters radius from sources of ground and surface drinking wter.
5. Adequate water supply.
6. Location should conform to the local zoning ordinance (Barangay and Municipal):



Required distances for putting up a piggery.

Classification	Distance from ground water source (m)	Distance from built-up (m)	Distance from major rd./ highway (m)	Distance between poultry farms (m)
Backyard	25	N/A	N/A	N/A
Small	25	500	200	500
Medium	25	1,000	200	1,000
Large	25	1,000	200	1,000

7. Other siting considerations:
    - Avoid sites with permeable soils or fractured bedrock;
    - Maintain recommended property setbacks from water courses, wells, and neighbors;
    - Provide adequate lot slopes on outside lots for surface drainage;
    - Allow for potential expansion;
    - Wind protection enhances performance; and
    - Ensure upslope runoff is diverted away from the feedlot.

Implementation

1. Waste residue in the septic tank to be regularly collected, dried and used as organic fertilizer.
2. Provision of water for regular cleaning of pig pens sweeping wastes to the septic tank.
3. No direct discharging of wastes into grounds, canals or waterways.
4. Runoff control for odors:
    - Diversion canals or dikes constructed to direct surface water runoff away from the site;
    - Grass filter strips where appropriate employed;
    - Provide well-bedded dry resting areas;
    - Avoid continuous wetting of manure by preventing watering facilities from overflowing;
    - Time cleaning process in relation to seasonal weather conditions.
5. Consider use of biogas for waste utilization to reduce energy consumption. If People's Organization (PO) can afford, construct Biogas Digester to avoid pollution of ground water and produce methane gas for cooking.

Planting Materials Supply/Nursery for Fruit Trees

Design

1. Well ventilated.
2. Well-structured nursery for synchronized movement of people (potting

area, sterilization area, etc.).
3. Use appropriate, local materials in providing shade.
4. Consider greenhouse designs for germination purposes.

Site Selection

5. Accessible to transport.
1. Accessible to sources of good planting materials.
2. Consider light requirements (should be located on areas with less exposure to drastic temperature).
3. Available good planting medium.

Implementation

1. Regular maintenance; watering, sanitation, etc.
2. Soil media sterilization.
3. Use organic fertilizers.
4. Practice appropriate disease control and prevention measures.

Mushroom Production
(Cultural management may vary according to variety)

Design

1. Mushroom house design: Combination of indigenous materials with G.I. roofing to provide heat for spawn production. Approximate floor area: 5 meters by 5 meters;
2. Approximate roof height: 2.5 meters;
3. Hard-packed soil flooring or concrete flooring;
4. The mushroom house should be designed in such a way that a constant temperature can be maintained;
5. If producing own spawns, ensure design of sterile laboratory, isolated from production areas.

Site Selection

1. Depending on variety, should be located within compatible conditions and in open area.
2. Adequate water supply.
3. Accessible to transport of materials and produce.
4. Accessible to material inputs: wood waste, rice hull, banana stalk, others.

Implementation

1. Spawn production using inoculants must be in sterile area.
2. Use PPEs to avoid eye/skin contact with worker.
3. If using autoclave, ensure safe distance from residential and storage areas.
4. Use sustainable fuel source.
5. Use sustainable material inputs for medium.
6. Regularly clean work area.
7. Reuse medium as organic fertilizer.

Production of Organic Fertilizers
(Compost and vermicompost)

Design

1. Facilities shall be designed such that compost piles, windrows, residues and processed material will not come in contact with surface storm run-off.
2. Provisions shall be made such that leachates are re-circulated back into compost piles or windrows as much as possible.
3. Combined engineering and vegetation (trees/vetiver) measures to decrease possibilities of soil disturbance, removal or loss of topsoil, and soil erosion from earthmoving activities as well as siltation.

Site Selection / Location of Water Source

1. The Facility shall not be sited in areas subject to frequent flooding, unless engineering controls are provided in the design to prevent inundation of the facility.
2. Situated at least 500 meters from residential areas
3. Adequate water supply:
    - for watering and washing of livestock, washing of trucks, washing of carcasses and by-products, and for cleaning and sterilizing equipment and process areas.
    - Rates of water consumption can vary considerably depending on the scale of the plant, the age and type of processing, the level of automation, and cleaning practices. Typical figures for fresh water consumption are 2–15 m^3 per ton of live carcass weight.

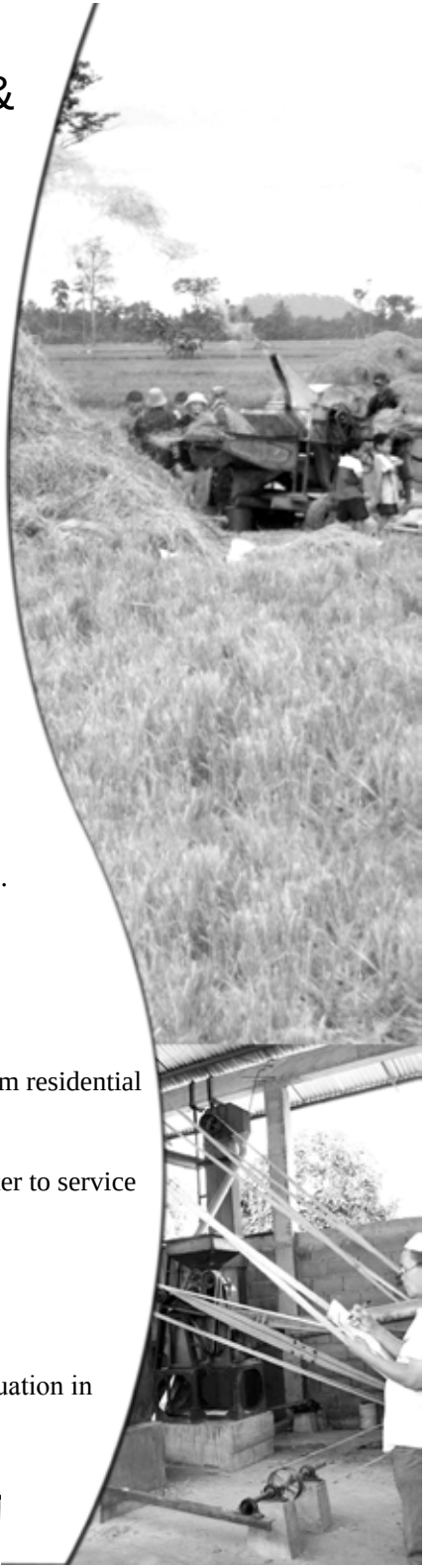
Implementation

1. Schedule hauling of construction materials to avoid traffic.
2. Monitor for possible leachate contamination of surface and groundwater resources.
3. Provisions for vector, odor, litter and dust control shall be included.
4. Residues shall be managed as solid waste and shall be disposed of as such.
5. Temperatures of compost piles, curing piles and processed composts shall be maintained in safe levels to prevent spontaneous combustion.
6. Aerobic conditions shall be maintained to prevent creation of dangerous gases such as methane.
7. Schedule hauling of construction materials to avoid traffic.
8. Monitor for possible leachate contamination of surface and groundwater resources.
9. Provisions for vector, odor, litter and dust control shall be included.
10. Residues shall be managed as solid waste and shall be disposed of as such.
11. Temperatures of compost piles, curing piles and processed composts shall be maintained in safe levels to prevent spontaneous combustion.
12. Aerobic conditions shall be maintained to prevent creation of dangerous gases such as methane.

FARM MACHINERY & POSTHARVEST FACILITIES

Farm machinery service center and construction, repair and maintenance **service for fishing facility**

(Motorized and non-motorized bancas and fish driers)



Design

1. Layout reflects economy of movement and space.
2. Inclusion of waste treatment disposal plan especially for petro-oil products.
3. Allocate space for packing house activities.
4. Noise considerations.

Site Selection

1. Open space, with a minimum of 500 m from residential areas
2. Avoid flood prone/low-lying areas
3. All weather road available connecting center to service areas

Implementation

1. Install transformer to prevent voltage fluctuation in area.

2. Use of PPEs.
3. Proper training on safety precautions among employees.
4. Energy conservation:
    - implementing switch-off programs and installing sensors to turn-off or power-down lights and equipment when not in use;
    - improving insulation on heating or cooling systems and pipe work etc.;
    - insulating and covering scald tanks to prevent heat loss;
    - recovering waste heat from effluent streams, vents, exhausts and compressors;
    - recovering evaporative energy in the rendering process using multifactor evaporators;
    - maintaining a leak-free compressed air system;
    - favoring more efficient equipment;
    - improving maintenance to maximize energy efficiency of equipment;
    - maintaining optimal combustion efficiencies on boilers; and
    - eliminating steam leaks.

Rice/Corn Mill, Thresher

Design

1. Incorporate air cleaning system (collection of dust and other suspended solid).
2. Layout reflects economy of movement and space.

Site Selection

1. Accessible to clients/producers/consumers.
2. Observe zoning and secure locational clearance.

Implementation

1. Promote and practice proper disposal. Discourage rice hull burning.
2. Observe hygiene in work place.

Cold Storage

Design

1. Installation of APCD.
2. Provision of an effective (at least 3-chamber) septic tank to treat effluent discharge.
3. Provision of adequate wastewater treatment plant to enable. compliance of effluent to DENR water quality standards.
4. Use of non-CFC refrigerants; fugitive losses of refrigerants.
5. Allocate space for packing house activities.

Site Selection

1. Avoid flood-prone / low-lying areas.
2. Avoid congested/populated/busy areas.
3. Accessibility to refrigerated vans (large trucks).
4. Adequate water supply.

Implementation

1. Proper housekeeping and maintenance of waste treatment premises.
2. Proper disposal of waste.
3. Regular monitoring of water quality of effluent.
4. Install physical barriers to protect refrigeration equipment from impact areas where forklifts are used.
5. Provide energy conservation principles and practices.

FOOD PROCESSING

Dried mango processing, mango juice, mango puree, mango puree, **banana chips, wine, flour** and vinegar, fruit candy processing, vegetables, **coffee, fish drying, and** meat such as smoked ham, tocino, embutido, etc.

Design

1. Basic considerations for air and odor emissions and energy consumption.
2. Layout reflects economy of movement and space
3. Inclusion of waste treatment plan:
   - High effluent discharges with high Biological Oxygen Demand (BOD); and
   - High water consumption
4. Noise considerations.
5. Proper drainage.

Site Selection

1. Adequate water supply:
   - Water is used for the watering and washing of livestock, the washing of trucks, washing of carcasses and by-products, and for cleaning and

sterilizing equipment and process areas.
    - Rates of water consumption can vary considerably depending on the scale of the plant, the age and type of processing, the level of automation, and cleaning practices. Typical figures for fresh water consumption are 2–15 m^3 per ton of live carcass weight.
2. Observe proper zoning/locational clearance.
3. Avoid flood prone/low-lying areas.
4. Siting minimum of 500 m from residential areas.

Implementation

1. HACCP plan should be in place:
    - undertaking dry cleaning of trucks prior to washing with water;
    - using automatically operated scalding chambers rather than scalding tanks for the de-hairing of pigs;
    - using transport systems that avoid or minimize the use of water;
    - using dry dumping techniques for the processing of cattle paunches and pig stomachs that avoid or minimize the use of water, instead of wet dumping techniques;
    - reusing relatively clean wastewaters from cooling systems, vacuum pumps etc. for washing livestock if possible;
    - reusing final rinse waters from paunch and casings washing for other non-critical cleaning steps in the casings department;
    - reusing wastewaters from the slaughter floor, carcass washing, viscera tables and hand-wash basins for the washing of inedible products if possible;
    - reusing cooling water from the singeing process for other application in the pig de-hairing area;
    - reusing the final rinse from cleaning operations for the initial rinse on the following day;
    - using dry cleaning techniques to pre-clean process areas and floors before washing with water;
    - using high pressure rather than high volume for cleaning surfaces;
    - using automatic control systems to operate.

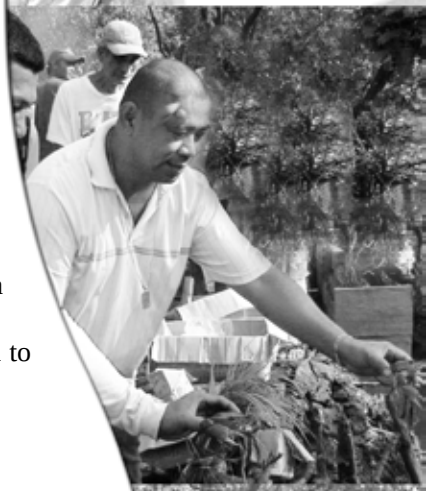
2. Strategies:
    - maximizing the segregation of blood by designing suitable blood collection facilities and allowing sufficient time for bleeding, typically seven minutes;

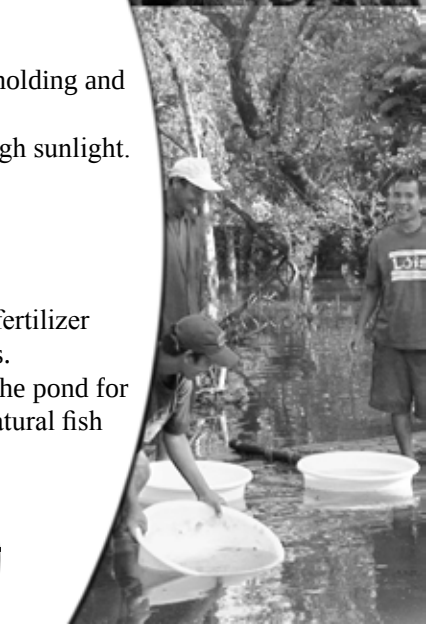
- sweeping up solid materials for use as by-products, instead of washing them down the drain; fitting drains with screens and/or traps to prevent solid materials from entering the effluent system;
- using offal transport systems that avoid or minimize the use of water;
- using water sprays with a pressure of less than 10 bar for carcass washing to avoid removing fat from the surface;
- using dry cleaning techniques to pre-clean process areas and floors before washing with water;
- Segregating high-strength effluent streams, such as rendering effluent and wastewaters from paunch washing, and treating them separately.

3. No accumulation of debris and other waste matter.
4. Observe proper hygiene and sanitation practices.
5. Key energy saving strategies:
   - implementing switch-off programs and installing sensors to turn-off or power-down lights and equipment when not in use;
   - improving insulation on heating or cooling systems and pipe work etc.;
   - insulating and covering scald tanks to prevent heat loss;
   - recovering waste heat from effluent streams, vents, exhausts and compressors;
   - recovering evaporative energy in the rendering process using multieffect evaporators;
   - maintaining a leak-free compressed air system;
   - favoring more efficient equipment;
   - improving maintenance to maximize energy efficiency of equipment;
   - maintaining optimal combustion efficiencies on boilers;
   - eliminating steam leaks.

AQUACULTURE

Backyard Tilapia Raising





Design

1. Pond treatment for concrete ponds should be conducted to remove toxic effect of cement.
2. The base of the trapezoidal dike is 2 meters and a height of 1.5 meters to 2 meters.
3. Provision of water inlet, water outlet and an over flow pipe.
4. Fill pond with water at an initial depth of 5 to 10 cm after applying organic fertilizer for a week to allow growing of algae which will serve as natural feed for the fish.
5. The desired water level for tilapia pond is 1 to 1.5 meters.

Site Selection

1. Select a site with clay soil for better water holding and continuous water supply.
2. Open space, free from floods, and has enough sunlight.

Implementation

1. Maintain natural fishpond by adding more fertilizer using organic matter, i.e. chicken droppings.
2. Plant kangkong and gabi at one portion of the pond for shading purposes and growing media for natural fish pond.

3. Check dike regularly to prevent seepages and leakages and maintain the pond free from weeds.
4. Check gates regularly to prevent entry of other fish species and avoid loss of stocks.
5. Plant trees within the sources of water to maintain the flow and protect the river beds from toxic waste water and pesticides and avoid dumping of garbage.
6. Plant trees and grass near the dike to prevent erosion.

Blue Crab Harvesting

Design

Use of indigenous materials in containing area as well as use for traps.

Site Selection

1. Potential areas for blue crab harvesting is sandy-mud flats. and tidal areas along the coasts with water depth of about 2-3 meters during high tide or around 3-5 meters distance from the shoreline.
2. Ensure location in Class **SB** waters (see Annex 4).

Implementation

1. Consider sustainable practices, i.e., Juveniles have to be set free.
2. Use of indigenous and sustainably derived materials for bait, traps, and other maintenance gadgets.

Design

1. Use indigenous and sustainably derived materials.
2. If using string method, make a knot at every after one shell and hang the strings at least 0.5 to 2 feet from the bottom to avoid siltation and predation.
3. Provide sea lane between plots for easy monitoring and harvesting.

Site Selection

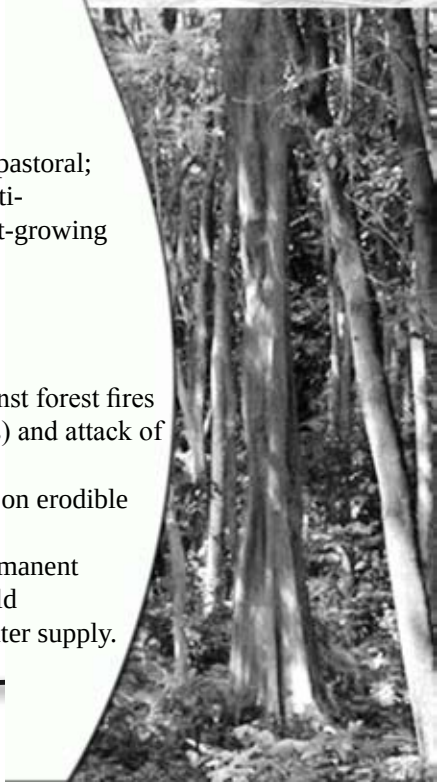
1. Select a site with inland sea far from estuaries where flood occurs.
2. Brackish to marine water.
3. Salinity is 20-35 ppt, medium depth of water is 3-5 meters during low tide.
4. No red tide history.
5. Ensure location in Class SB waters (see Annex 4).

Implementation

1. Monitor the farm regularly.
2. Repair and replace damaged structure immediately.
3. Remove all debris brought about by floods, including the sponges growing on the surface of the talaba.

AGROFORESTRY & MANGROVE PLANTATION

Agroforest and Forest Plantations



Design

Agroforestry:

- Conforms to the Indigenous Knowledge Systems particularly of **IP**s in cases where there are **IP**s;
- Sequential planting of tree crops and short-rotation crops;
- Provision of soil and water conservation through establishment of vegetative strips along contour lines and/ or hedgerows;
- Alley cropping in sloping or erodible areas;
- Choice of Agroforestry system either agro-silvi-pastoral or aqua-agro-silvi-pastoral;
- Choice of species for hedgerows (multi-purpose plant species), shrubs and fast-growing tree species, and agricultural crops;
- Sufficient supply of water;

Reforestation:

- Provision of protection measures against forest fires (fire lines, fire breaks, look-out towers) and attack of pest and diseases;
- Planting along contour lines specially on erodible and sloping areas;
- Strategic location of bunk houses, permanent nurseries and satellite nurseries. Should consider accessibility and adequate water supply.

- Availability of water supply;
- Multiple tree species to minimize infestation;
- Planting of species by blocks for easy identification;
- Roads and trail system for accessibility especially during transport of seedlings from nursery to the planting site.

1. Agroforestry design conforms to Indigenous Knowledge Systems particularly of Indigenous Peoples (IPs).
2. Consistency with proposed tree crop diversity.
3. Use of combined engineering, vegetative and organic/indigenous/local materials for erosion control measures.

Site Selection

Agroforestry:

- Presence of nurse trees to provide shade and act as cover crops.
- Availability of water supply.
- Good soil condition to match specific tree crops and agricultural crops to be planted.
- Accessibility (roads and trails).

Reforestation:

- Site suitability assessment to include soil and water condition;
- Site-species matching to determine suitable species to be planted; and
- Presence of nurse trees as cover crop and for shade purposes.

1. Refer to land use plan.
2. Conduct site characterization prior to design and establishment.
3. Availability and accessibility of high potential and disease-free planting materials.
4. Adequate and reliable water supply (ground and surface water).

Implementation

Agroforestry:

- Survey, mapping and planning (SMP);
- Laying -out of contour lines/hedgerows in sloping areas using A-frame;

- Planting of multiple tree crops and agricultural crops;
- Compartmentalization or cut-and-carry for livestock feeding; and
- Use of organic fertilizers.

Reforestation:

- Survey, Mapping and Planning (SMP);
- Establishment of bunk houses, permanent nursery and satellite nurseries and should be located strategically;
- Regular monitoring and patrolling activities;
- Planting of indigenous and fast growing species to enhance species diversity;
- Conduct of silvicultural operations/treatments such as thinning, salvaging, and clearing of vines to improve the timber stand quality of the forest plantation;
- Establishment of roads and trails for seedling transport and hauling;
- Assisted natural regeneration activities to augment planting stocks;
- Hardening-off of seedlings prior to field planting (Hardening-off means to expose the plantable seedlings to field / plantation conditions).

1. Limit or regulate field activities to minimize disturbance of critical wildlife species and their habitats.
2. Use of bench method of soil erosion control to stabilize the slope.
3. Riprapping of cut areas.
4. Stabilization of the slope through revegetation or establishment of plant species on open areas.

Eucheuma Farming

Design

1. Use local/indigenous materials in a sustainable manner.
2. Clear the site of undesirable species such as sea urchin, starfish and foreign materials destructive to eucheuma.

Site Selection

1. Pollution-free waters, far from rivers, streams, creeks or any freshwater source.
2. Should be protected from large waves and strong winds but possesses good exchange of water.
3. Potential sites for farming are areas with natural eucheuma beds.

Implementation

1. Prepare planting materials in shaded area.
2. Keep plants clean by weeding or removing other plants and debris.
3. Replace lost, dead and unhealthy plants.
4. Avoid entry of blast fishing and trawls in farms.

Aquasilviculture for Marginal Fishers

Design

1. Clean selected area with organic debris.
2. Establish the mangrove plantation using the appropriate spacing and species.
3. Use 60% of the area for mangrove tree plantation and 40% for aquaculture.
4. Establish buffer zone of 100 meters mangrove vegetation from the sea to the main peripheral dike and 20 meters along the riverbanks for protection.
5. Install bamboo traps at the mouth of the floodgate to avoid fish and crustaceans to escape during harvesting.
6. Construct dikes (with top width of not less than 3 meters and height of 2.4 meters) to control water.
7. Build the dikes in trapezoidal position to give margin against overtopping at high tide, flood and wave actions.
8. Construct canal system (1-2% of the total pond area).
9. Ensure that the canal starts from the gate and traverses the central portion of the pond.

Site Selection

1. Open areas for rehabilitation purposes.
2. Areas covered by Fishpond Lease Agreement (FLA) but not developed or abandoned.
3. Area subject to daily with tidal flooding and freshwater inflow.
4. Water should be clean and free from inorganic and organic pollution.
5. The ideal area should have distinct rainfall patterns, not prone to typhoons and damaging floods.

Implementation

1. Use appropriate site-species selection.
2. Dominant mangrove species in the adjacent area will be used as planting material for mangrove plantation for sustainability.
3. Apply lime for newly constructed pond at about 350kg/ha to neutralize acidity.
4. Replace dead plants immediately.
5. Conduct thinning and pruning regularly.
6. Remove and burn infested plants to avoid spread of infestation.
7. Allow tidal flow when sudden rain occurs in summer to provide aeration and minimize abrupt change in temperature and salinity.

Mangrove Plantation and Utilization

Design

1. Subdivide large areas for easier maintenance, management and harvesting.
2. Provide space (3-5 meters) in between compartments for movement of people and 10 meters space or bigger for passage of banca.
3. Establish peripheral fence to protect young plants.

Site Selection

1. Select sites which are sheltered (like coves) and free from strong winds, waves and tidal currents and typhoons.
2. Open area or sparsely vegetated areas.
3. Select shallow area which provides longer time for plants to be above water resulting to faster growth and high survival of seedlings.

Implementation

1. Collection of mature and healthy propagules from local sources.
2. Plant from April to June when mature propagules are abundant and weather condition is favorable.
3. Remove debris deposited on plants as this can cause injury and breakage.
4. Replant dead plants with newly collected propagules.
5. Maintain the peripheral stakes of plantation.
6. Conduct appropriate silvicultural treatments regularly.

ANNEX 1

SES BASIC DOCUMENTARY REQUIREMENTS

1. Social and Environmental Assessment (feasibility study)
2. Environmental Management Plan (EMP)
3. Environmental Compliance Certificate (ECC) for covered projects
4. Duly accomplished Displaced Persons Survey forms:
    - Form 1. Entitlement Survey of Displaced Persons (Annex 2)
    - Form 2. Inventory and Entitlement of Project Affected Persons (Annex 3)
5. Free and Prior Informed Consent (FPIC) / Indigenous People Consent (NCIP A.O. No. 1 series of 2006)
6. Deed of Sale / Deed of Donation (subprojects that required land acquisition)

ANNEX 2

Survey No._____
Date of Survey_____

Republic of the Philippines
Department of Agriculture
Mindanao Rural Development Program

ENTITLEMENT SURVEY OF DISPLACED PERSONS

Component:		Proj. No.:		Barangay:	
Municipality:		Province:		Region:	
Name of Head of HH:			Number of Persons in HH:		
Total Landholding	SQ. MTS	Lot No.		Pls. No.	
PROPERTIES TO BE AFFECTED BY THE PROJECT		QUANTITY	REMARKS	ENTITLEMENTS	
A. LAND					
1. Residential 2. Commercial 3. Agricultural		sq.m. sq.m. sq.m.			
B. CROPS (Specify)					
1. 2.		sq.m. sq.m.			
C. Trees (Specify age)					
1. 2.		nos. nos.			
D. Structures (Specify)					
1. Permanent 2. Temporary 3. Tombs 4. Wells		sq.m. sq.m. Nos. No.s			
E. Economic Losses (Explain briefly)					
1. Business Lost 2. Income Loss 3. Temporary Losses					
F. Others (Explain briefly)					
1. 2.					
G. Sketch					

Survey Conducted by:

_____ _____ _____

Brgy. Representative Municipal Representative MRDP Representative

CONFORME: _____

Name and Signature of HH

Note: Attach DONATION PAPER or Affidavit of "Quit Claim" in case the affected person shall not claim for any entitlement.

ANNEX 3

Republic of the Philippines
Department of Agriculture
Mindanao Rural Development Program

PCO Entry:

INVENTORY & ENTITLEMENT OF PROJECT AFFECTED PERSONS

Component:											**Project Number:**								
Barangay:					**Municipality:**						**Province:**					**Region:**			
			Land and Crop Losses						**Structures Losses**						**Other Losses**						
Survey No.	Name of Head of Household	No. of Persons in HH	Total Landholding of Hhold in Sq. M.	Land to be Acquired by Type in Sq. M.	Land Type	Loss as % of Total	Paddy area in Sq. Meters	Fruit trees Lost Type and Number	No. & Type of lost structures	Structures Permanent in Sq. M.	Structures Temp.in Sq. M.	Area of Residential Land Lost in Sq. M.	Residence (rented)	Temporary losses (Specify)	Wells No.	Tombs Number	Business lost	Income Lost	Other (Specify)	Total Entitlements in Pesos
1																				
2																				
3																				
4																				
5																				
6																				
7																				
8																				
9																				
10																				
11																				
12																				
13																				
14																				
15																				

*** Refer to Form No.1 (on file) as source of above data**

ANNEX 4

Revised Water Classification and Usage of Marine Waters
(From DENR Administrative Order 2008 - XX
Water Quality Guidelines and General Effluent Standards)

Classification	Intended Beneficial Uuse
Class SA	1. Protected Waters – Waters designated as national or localamarine parks, reserves, sanctuaries, and other areas established by law (Presidential Proclamation 1801 and other existing laws), and/or declared as such by appropriate government agency, LGUs, etc. 2. Fishery Water Class I – Suitable for shellfish harvesting for direct human consumption
Class SB	1. Fishery Water Class II – Waters suitable for commercial propagation of shellfish and intended as spawning areas for milkfish and similar species 2. Tourist Zones – For ecotourism and recreational activities 3. Recreational Water Class I – Intended for primary contact recreation (bathing, swimming, skin diving, etc.)
Class SC	1. Fishery Water Class III – For the propagation and growth of fish and other aquatic resources and intended for commercial and sustenance fishing 2. Recreational Water Class II – For boating, fishing, or similar activities 3. Marshy and/or mangrove areas declared as fish and wild-life sanctuaries
Class SD	1. Industrial Water Supply – For manufacturing processes after treatment, cooling, etc.) 2. Navigation and other similar uses

Note: For unclassified water bodies, classification shall be based on the beneficial use as determined by EMB.

Produced by:
Information, Advocacy, Communication and Education (InfoACE) Unit
Mindanao Rural Development Program 2
PROGRAM SUPPORT OFFICE

MINDANAO RURAL DEVELOPMENT PROGRAM

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DEPARTMENT OF AGRICULTURE

Pump-priming Mindanao's rural economy.