

MAPPING AND QUANTIFYING FEEDSTOCK AREAS FOR BIOETHANOL PRODUCTION

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Biomass Resource Inc.
Manila, Philippines*



Presentation Outline

- Bioethanol Production: An overview
- Sugarcane as feedstock for ethanol production-availability
- GIS on feedstock management and planning
- Potential GIS initiatives in process industries
- Environmental & Social Perspectives



Project Goals

- determination of the exact area planted with sugarcane
- establishment of a computer-supported geographic-based database management system for sugarcane farms
- providing management information to sugar industry stakeholders

Bioethanol Production: An Overview

- Bioethanol – is a light alcohol produced by fermenting carbohydrates, such as starch or sugar and is mixed to gasoline up to 10% blend
- Benefits:
 - Clean fuel
 - Boosts octane level help the car run smoothly
 - Biodegradable and has few harmful effect with the environment
- ≈ 20.7 M liters produced in the Philippines = 0.032% (65, 621.21 M liters) of the total world's production



Policy Support from the Government

- Republic Act 9637 – Biofuels Act of 2006
 - Mandates the blending of 1% biodiesel in PetroDiesel and 5% of bioethanol in gasoline for the first 4 years.



Feedstock for Ethanol Production within The Philippines

FEEDSTOCK	MT/HA	Li/MT	Croppings	Li/Ha/Yr
Sugarcane	65	70	1	4,550
Cassava	8	180	1	1,440
Sweet Sorghum				
● Stalk	50	50	2	5,000
● Grain	3	375	2	2,250

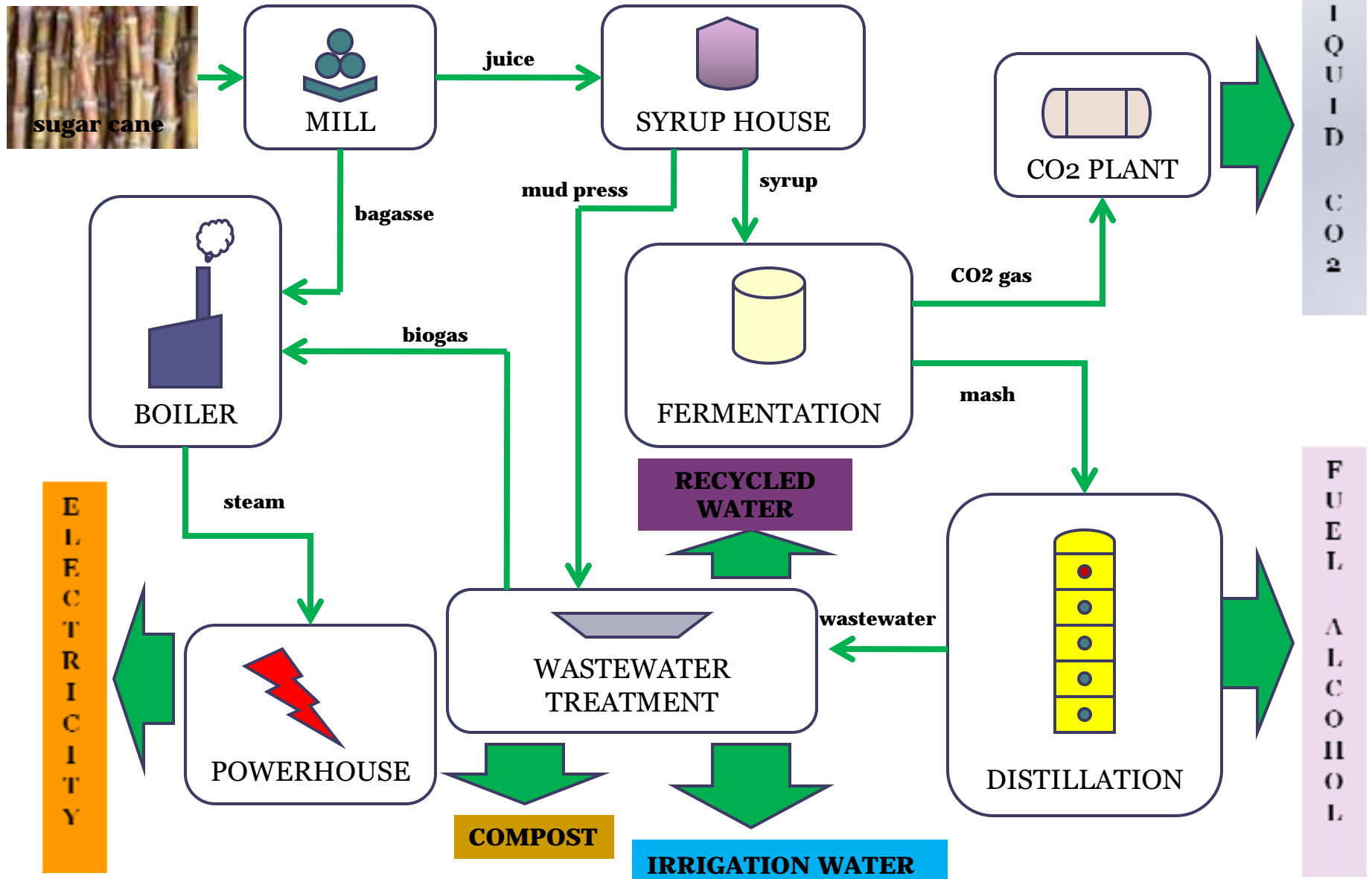
Source: Bureau of Agricultural Research, Department of Agriculture (www.bar.gov.ph)

SCBI: 1st Integrated Bioethanol and Co-generation Power Plant

- Situated in San Carlos City, Negros Occidental
- Requires 450,000 tonnes of cane spread over 10 months



BIOETHANOL PRODUCTION PROCESS FLOW



Source: San Carlos Bioenergy, Inc



Overview of Methodology

1. Data Collection

- GPS Survey
- Key Informant Interviews

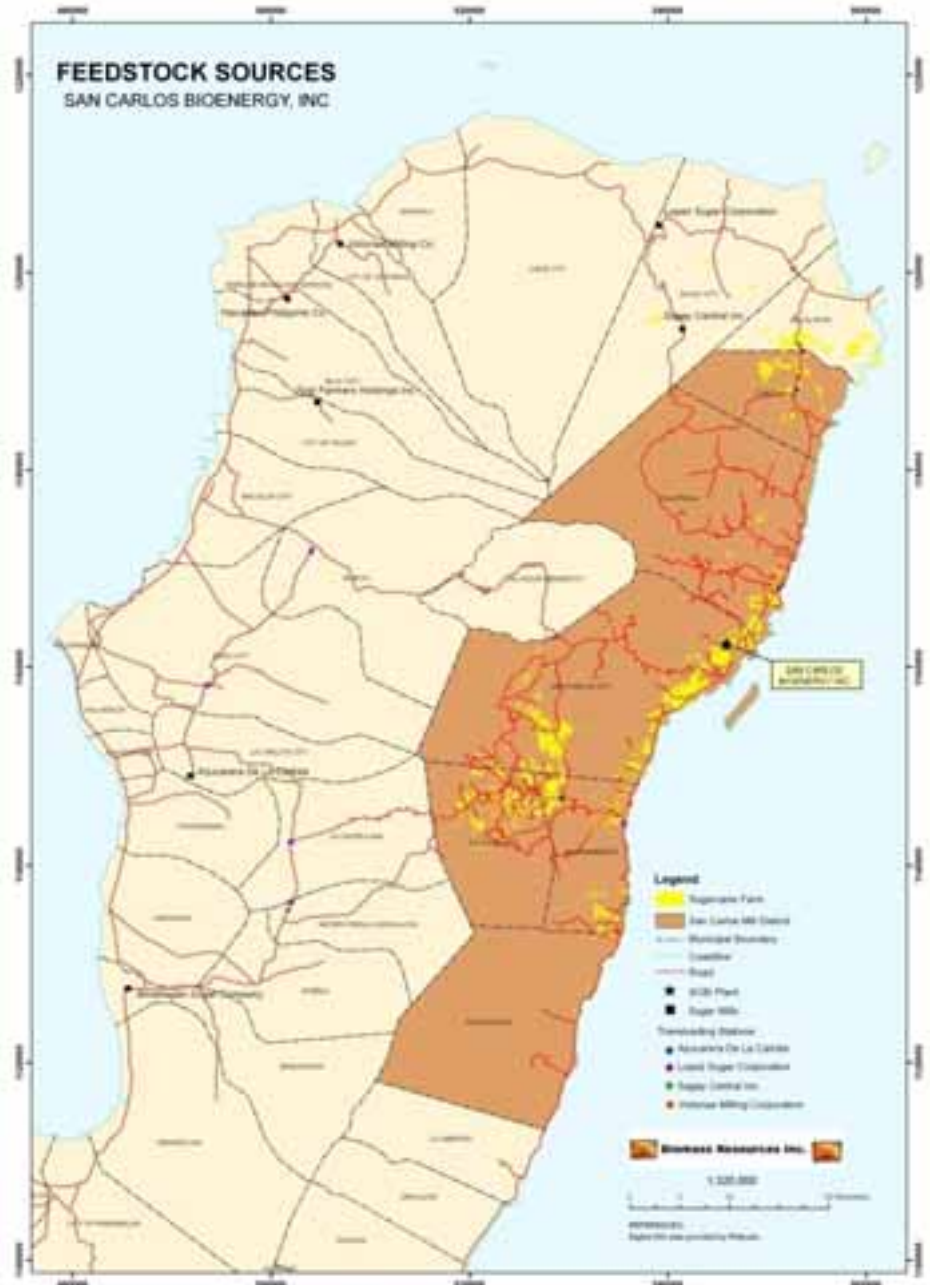
2. GIS Data-Building and Validation

3. Spatial Analysis

4. Production of Maps

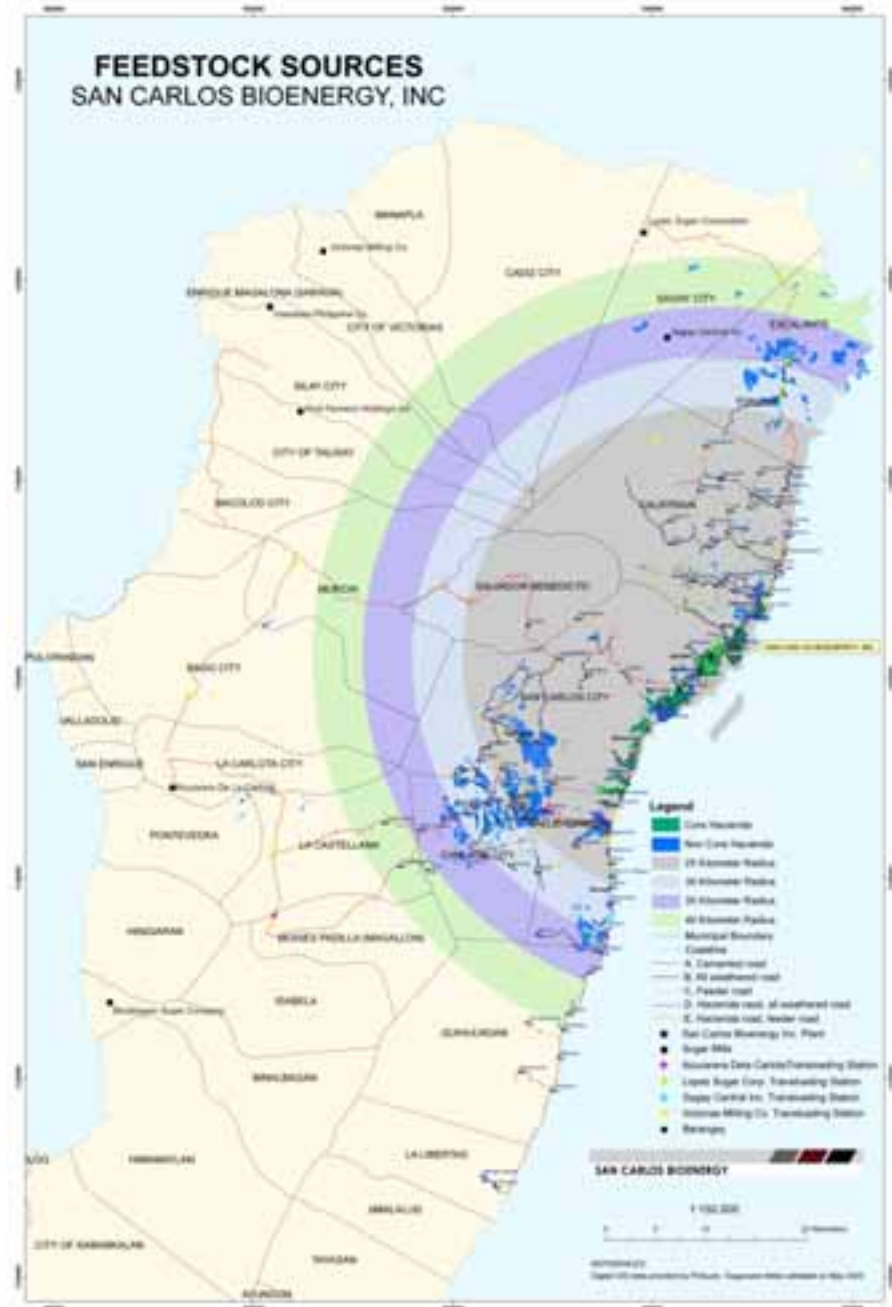
GIS on Feedstock Management & Planning

- District wide validation & mapping of sugarcane areas
 - Assess total available cane & allocation for ethanol production
 - Helps in the assessment & determination of the size of bioethanol facility

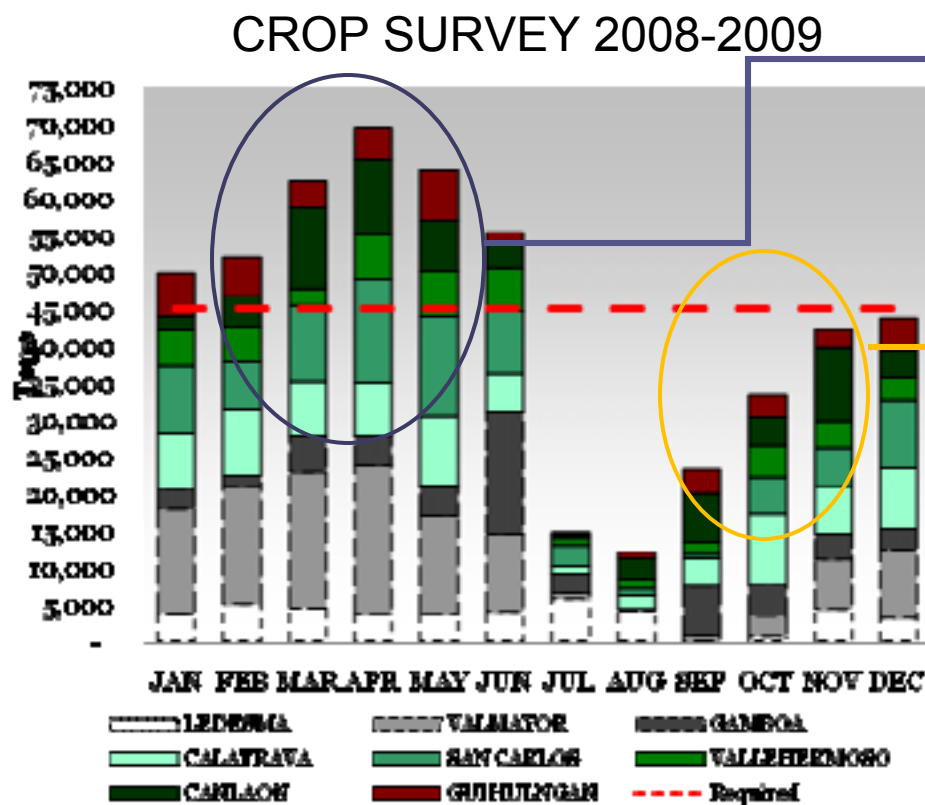


GIS on Feedstock Management & Planning

- District wide validation & mapping of sugarcane areas
 - Determines suitable sources based on distance to the plant
 - Assess areas that are productive and areas that would need assistance in increasing productivity level



CURRENT CANE HARVEST PRACTICE

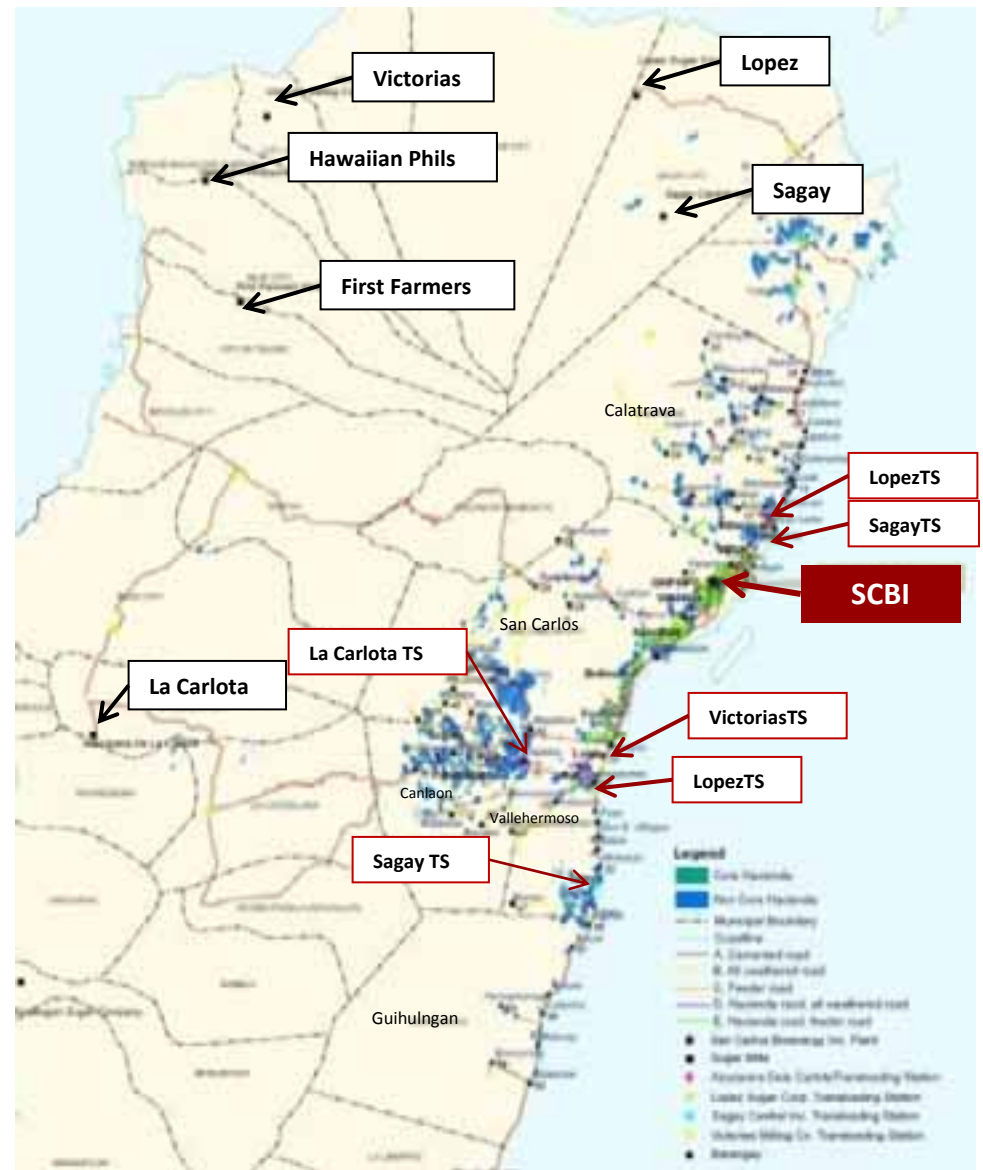


- Excessive supply during dry months
- Deficit supply during wet months

➔ ***Need to:***
REPROGRAM/
RESCHEDULING of
farm operations
from planting,
ratooning,
cultivation and
other farm
practices with the
choice of
appropriate variety

GIS on Feedstock Management & Planning

- Determine market competition
 - Assist in market strategies & Pricing
- Instrumental in logistic planning
 - Determine farm distance to the plant and assess road types
 - Determine truck requirements per area



SCBI Farm Information Database

PLANTER'S PROFILE

Benjamin G. Albiar

Other Name:

Harvest	Total Area (ha)	Location of Farm	Projected Yield (ton)	Variety	Classification
<i>Date of Harvest</i>	September-08				
Ben-01	4.00	BAGONBON, SAN CARLOS CITY	140.00	PHF 88-39	R1
Ben-02	3.00	BAGONBON, SAN CARLOS CITY	120.00	VMC 84-524/PS 1/CADP Sc 1	R2
Ben-03	3.00	BAGONBON, SAN CARLOS CITY	135.00	PHF 88-11	R1
TOTAL AREA	10.00	TOTAL YIELD	395.00		
<i>Date of Harvest</i>	October-08				
Ben-04	8.00	BAGONBON, SAN CARLOS CITY	120.00	PHF 88-11, VMC 84-947/PS 1	R2
TOTAL AREA	8.00	TOTAL YIELD	120.00		
<i>Date of Harvest</i>	January-09				
Ben-05	3.00	BAGONBON, SAN CARLOS CITY	175.00	PHF 88-11, PHF 88-39	R1
TOTAL AREA	3.00	TOTAL YIELD	175.00		
<i>Date of Harvest</i>	February-09				
Ben-06	7.00	BAGONBON, SAN CARLOS CITY	280.00	PHF 88-11	R2
TOTAL AREA	7.00	TOTAL YIELD	280.00		



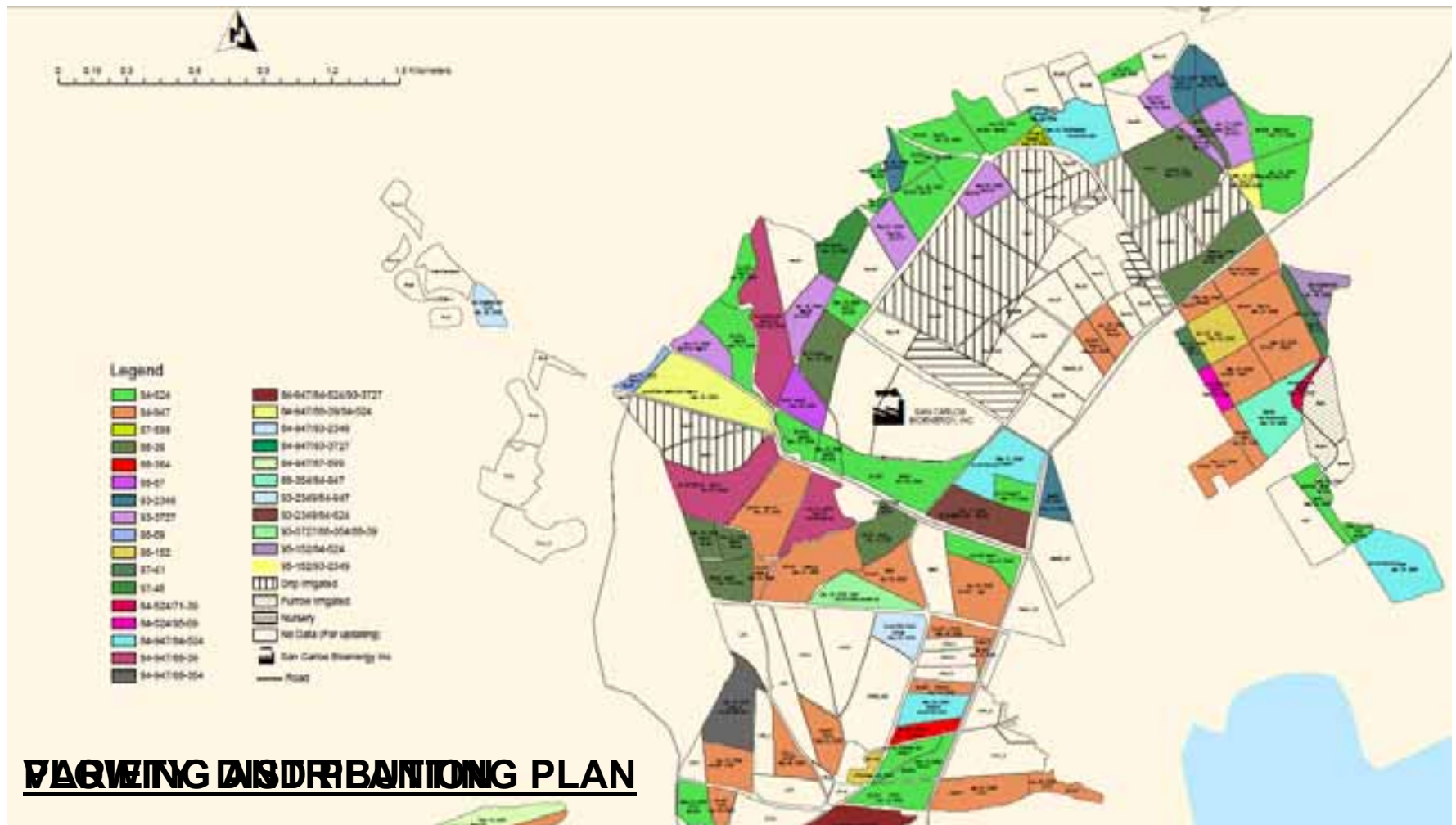
FARM INFORMATION SYSTEM

GEOGRAPHIC INFORMATION SYSTEM

- ≈ 10,000 hectares planted with sugarcane or 2.51% of the country's total sugarcane plantation
- ≈ 467 total number of planters - surveyed
- ≈ 650,000 Mtons – cane yield or 3% of the country's total cane production

GIS on Farm Planning & Operations

Gamboa Multi-purpose Farm-Workers Cooperative





GIS on Farm Planning & Operations

- Annual record of variety planted and its performance
- Assess productivity level of each field
- Records amount of fertilizer application and water level intake, in the case of irrigated fields



Potential GIS initiatives in Process Industries

- Raw Material Inventory
- Design Mass Balances
- Optimization of Equipment and Plant capacity
- Production Schedules

Conclusions

- Bioethanol is :
 - supported by the Philippine Government policy
 - Clean and environmental friendly
 - Reducing pollution but not the global warming
- GIS is :
 - Helpful in bioethanol production monitoring through its ability of :
 - Recording the variety and area planted
 - Assessing the productivity per field
 - Elaborating scenarios for the future