

Geo-Smart Asia 2015

Kuala Lumpur

GEOSPATIAL TECHNOLOGY SUPPORTING LAND ADMINISTRATION - THE FIJI ISLANDS SCENARIO

Towards the Next Big Leap

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Presentation Objectives

- A. Snapshots of progress made by countries in the Pacific region like Fiji in aspiring for smart land administration
- B. The supportive role of the geospatial industry in land administration
- C. Economic benefits of innovative geospatial tools and techniques for land administration
- D. Oververcoming the challenges

In the Beginning.....

“The early days of GIS were very lonely. No-one knew what it meant.”

Roger Tomlinson, Father of GIS (1960's)

“A map is the greatest of all epic poems. Its lines and colors show the realization of great dreams.”

Gilbert H. Grosvenor, Editor of National Geographic (1903-1954)

In Fiji and the Pacific we always aspire to get proper data accessibility and uniform standard for input.

But It requires :

- best practices
- Educated, trained and certified professionals
- Open data access and sharing
- standardized datum. !!

The genre of Geospatial data and information in land is a people information platform!!

Fiji Land information systems – a brief overview

- How can we drive economy
- Efficient and Effective land administration

Digital National Databases enabled for access and sharing

The concept of land is both a physical commodity and an abstract concept in that the rights to own or use it are much a part of land as the object rooted in its soil (Dale 1991; Dale and McLaughlin 1988).

- **February 1991**

Cabinet Decision No.33 of 1991 endorsed that:

- GOF adopt the National LIS Strategy as the prototype for LIS/GIS development in Fiji.
- Minister of Lands and Mineral Resources be responsible for the programme.
- FLIC to be established under the Chairmanship of Permanent Secretary for Lands and Mineral Resources

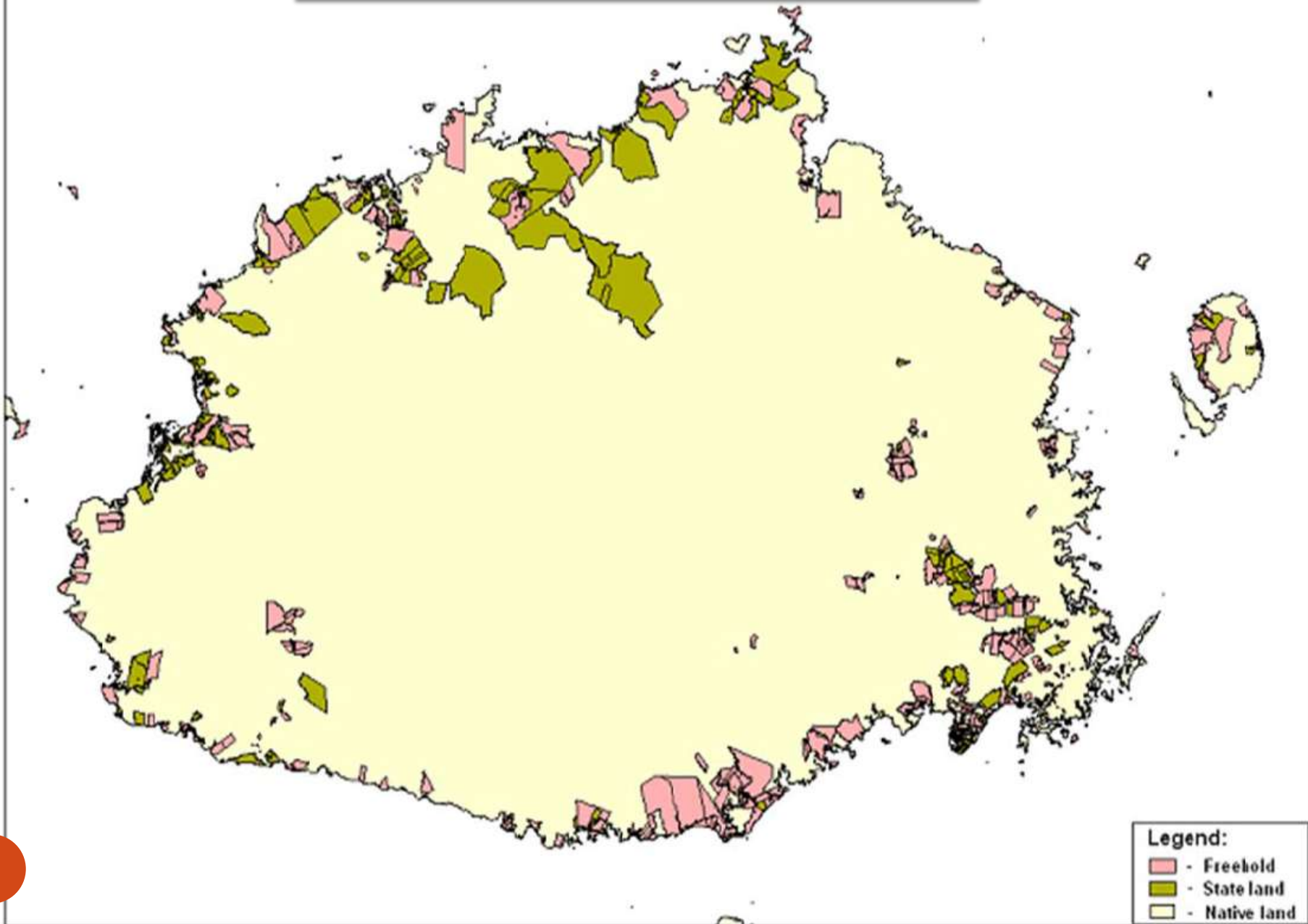
Tenure System

1. Freehold
2. State (Crown)
3. Native (Customary)
 - If we consider the legal parametric of the land system it is evident that the Pacific island countries hold their land in accordance with the traditional customs of indigenous people of those islands.
 - And in most islands like the American Samoa, Fiji, Nauru, Niue, Papua New Guinea, Solomon Islands, Tokelau, Tuvalu and Vanuatu a majority of 80% - 90% of land is under customary ownership.

- And some island countries have small amounts of land under customary ownership (Like Cook Islands and Kiribati) and others like Tonga which is owned by the indigenous King

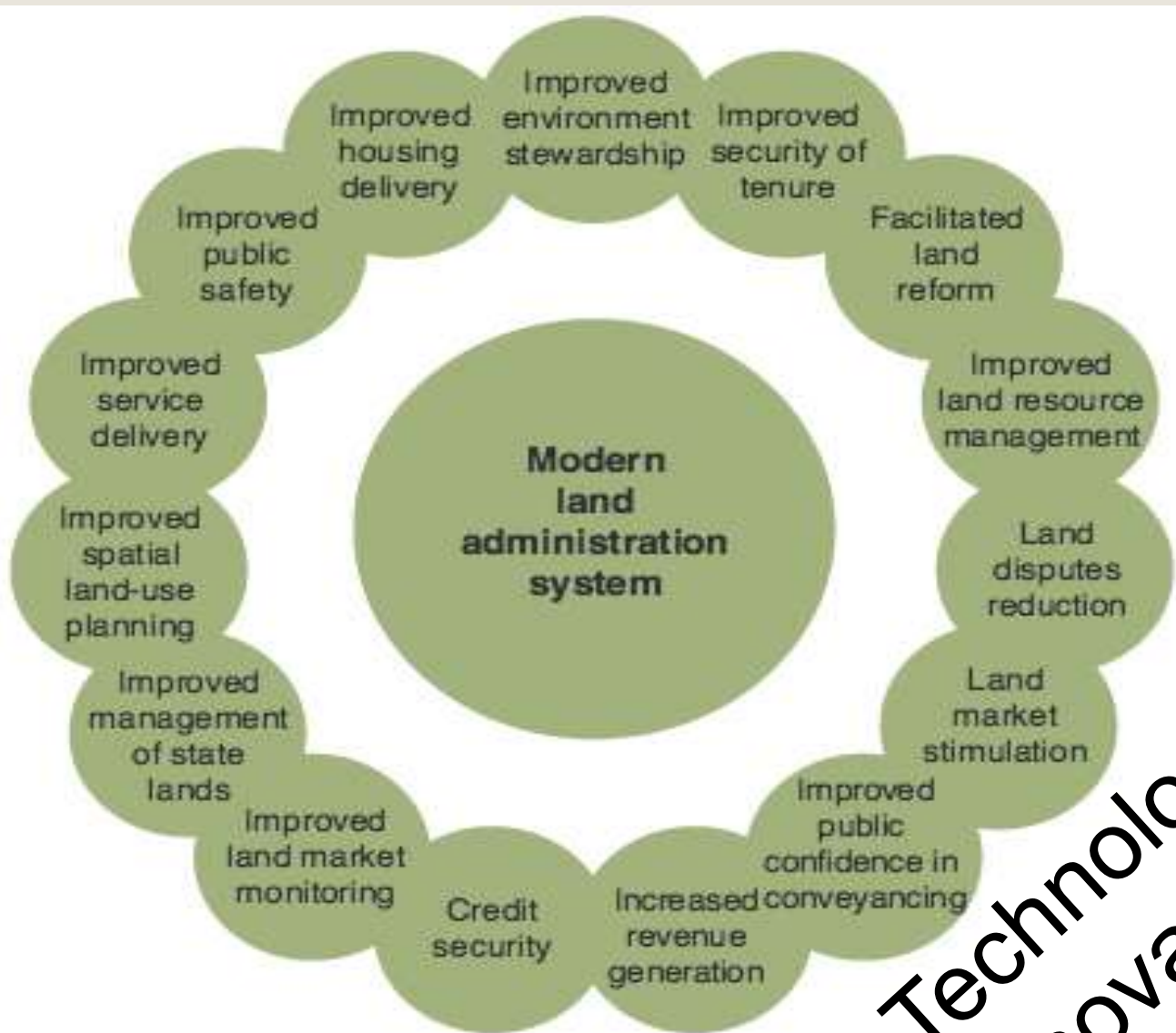


Fiji Viti Levu Land Tenure



Benefits of Good Land Administration

Reform



Technology Innovations

Source: Adapted from UNECE 2005.

Land Capable to Grow Pawpaw

		Papaya_R				Crop	Area(ha)	Yield (t)	Price average (FJD/t)	Total Revenue (FJD)
		Not Suitable		Suitable						
		Count	Table N %	Count	%					
SLOPE1	0-3 Deg	274	29.4%	295						
	4-7 Deg	38	4.1%	4	Pawpa	9,703	702,830	FJD2	1,405,660	
	8-15 Deg	76	8.1%	35	w Total					
	16-20 Deg	201	21.5%	4						
	Total	595	63.8%	338						



0 5 10 20 Kilometers



Land Reform program allowed for the identification of unutilized VIABLE land for development



Adaptation to Technology Change

Just a few examples....

Centralization of National Land Use Information

Decision making - Support

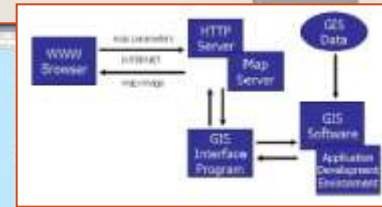
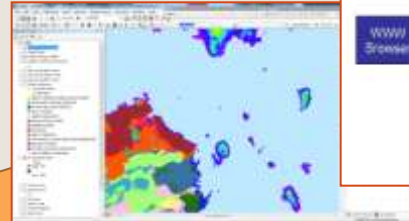


- Provide information to aid decision making on land use developments & potentials
- Convenient access to related information
- Effective action
- Support for un-utilized or underutilized areas



Desktop Analysis

- Collection of maps on land use activities
- Overlay Analysis
 - Suitability Analysis



Sharing of land use information



Planning

- User requirements
- Acquiring resources
- Project Plan

Decision making & land use information support system

GIS spatial data



Land Use Development Central Database

Data Preparations

- Editing & Improvements,
Modeling,
Analysis process
Evaluation
Verification

Digitizing and data transfer
Relevance of the datasets
Consistency



Research / textual data



Dissemination

GIS Maps disseminated through Web -GIS and PDFs

Project Staff - Lands Department

LIS Software, products & Tools

- Dron
- Rem
- ArcGIS

2. Natural Resource Mapping – Skyward Industries
 USP

- Ministry of Agriculture
- Natural Resources Planning
- Land Use Cover Change
- Terrain Analysis (Flood, Water Flow, Viewshed Modelling)

No legislations currently in place

4. - Land Registry

- Property Development
- Environmental management knowledge in advance

3. Land, N
 Resource
 Transport
 utilities

1. Poverty Index

2. Population

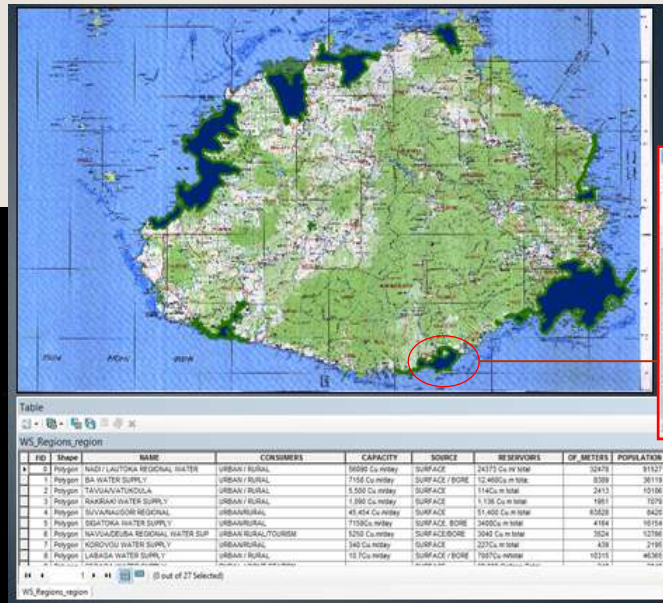
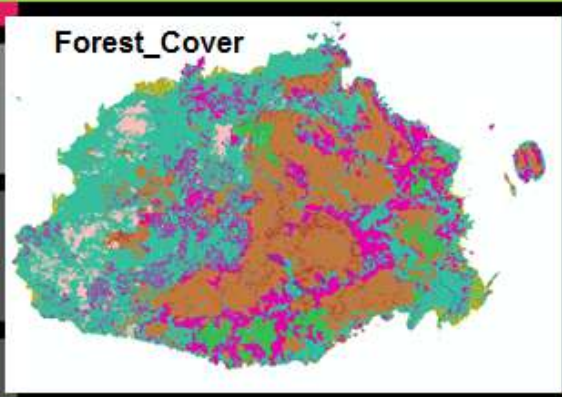
6. Spatial Planning and
 7. Spatial Economic Modeling

5. Environment -
 Great Relief Map
 -Climate change impacts
 - Disaster Recovery

- Fiji Bureau of Statistics
- Ministry of Agriculture
- Ministry of Lands and Mineral Resources
- Ministry of Roads and Infrastructure
- Sugar Industry
- Disaster

LAND USE

Forestry Data



Identify From: WAF Serviced Areas

NAVANOLEISA REGIONAL WATER SUPPLY

Location: 1,836,221.445 2,346,811.149 19889

Path: 1048

ID: 4

Shape: Polygon

Name: NAVANOLEISA REGIONAL WATER SUPPLY

CONSUMER: URBAN/RURAL/TOURISM

CAPACITY: 5200 Cu m/day

SOURCE: SURFACE/BORE

RESERVOIRS: 8400 Cu m tank

SP_NETS: 3324

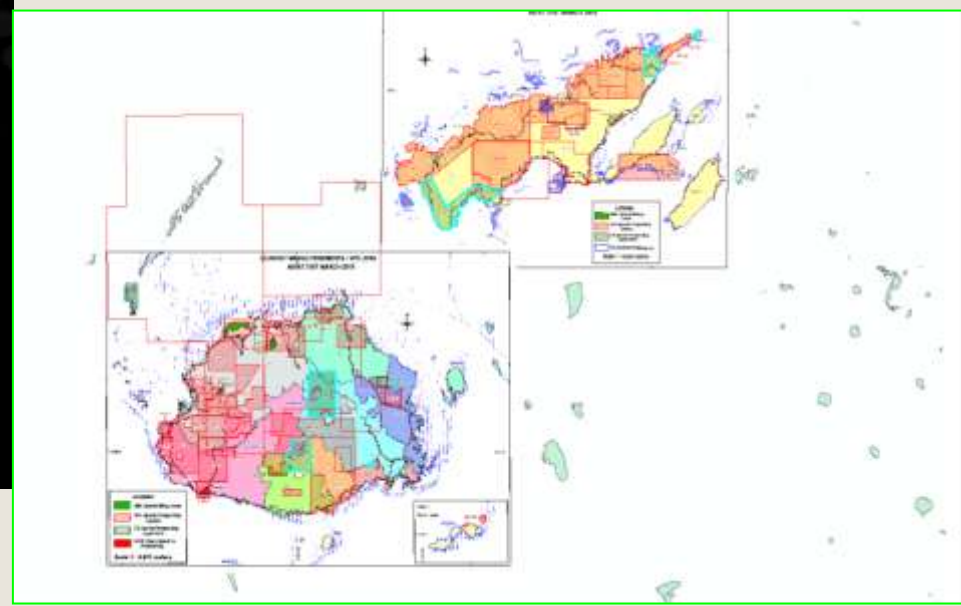
POPULATION: 12786

Show/Hide Features

WAF Serviced Areas, Dams, Main Water Pipes, Sewer Lines

- Forest Cover
- <all other values>
- Class
- Coconut
- Hardwood
- InlandWater
- MUF Close Forest
- MUF Open Forest
- Mangrove
- Non-forest
- PTF Close forest
- PTF Hardwood
- PTF Open forest
- PTF Softwood
- Softwood Plantation

- Coconuts
- Mahogany Plantations
- Pine Plantations
- Closed Forests
- Open Forests

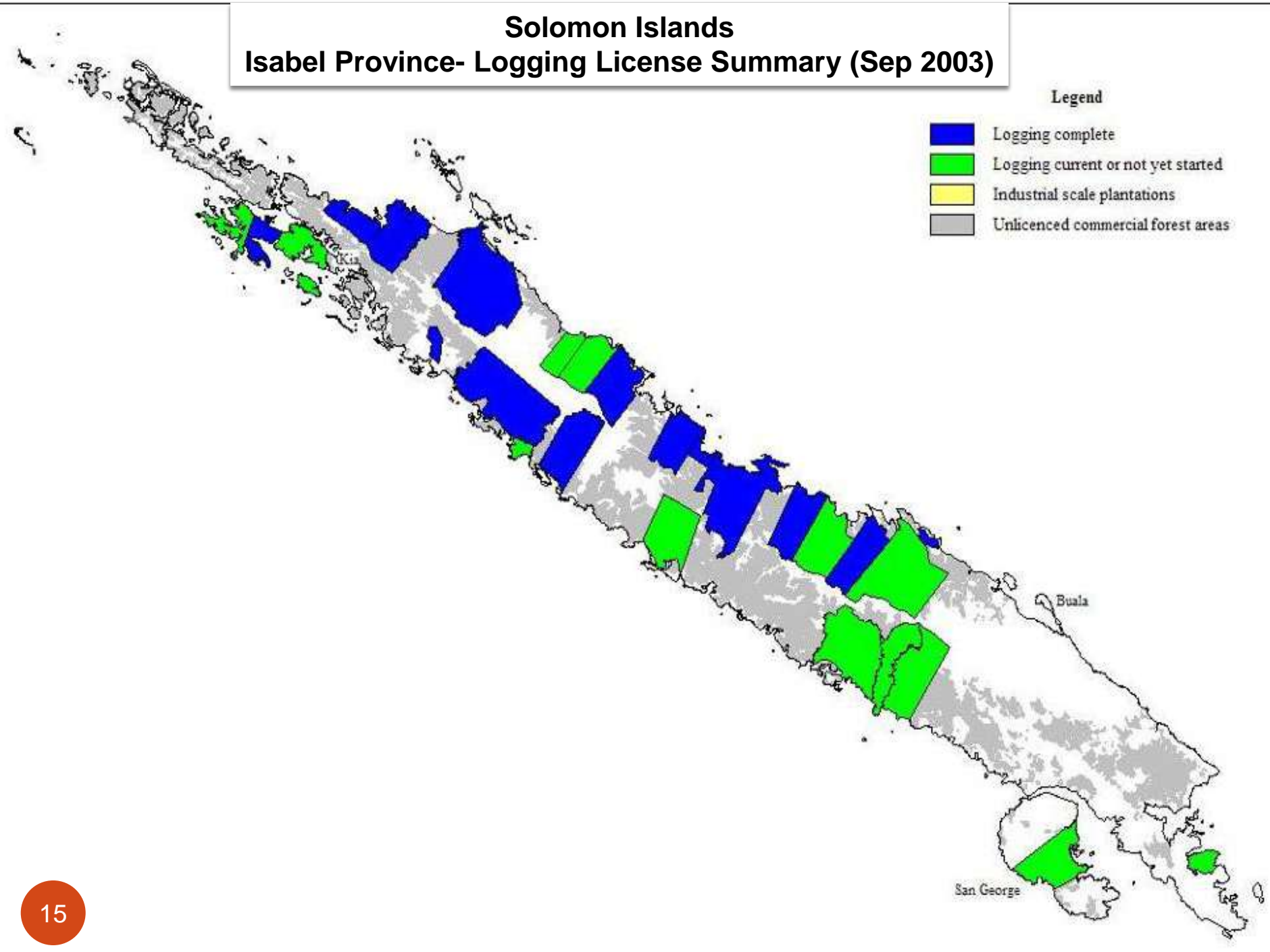


Solomon Islands

Isabel Province- Logging License Summary (Sep 2003)

Legend

- Logging complete
- Logging current or not yet started
- Industrial scale plantations
- Unlicensed commercial forest areas

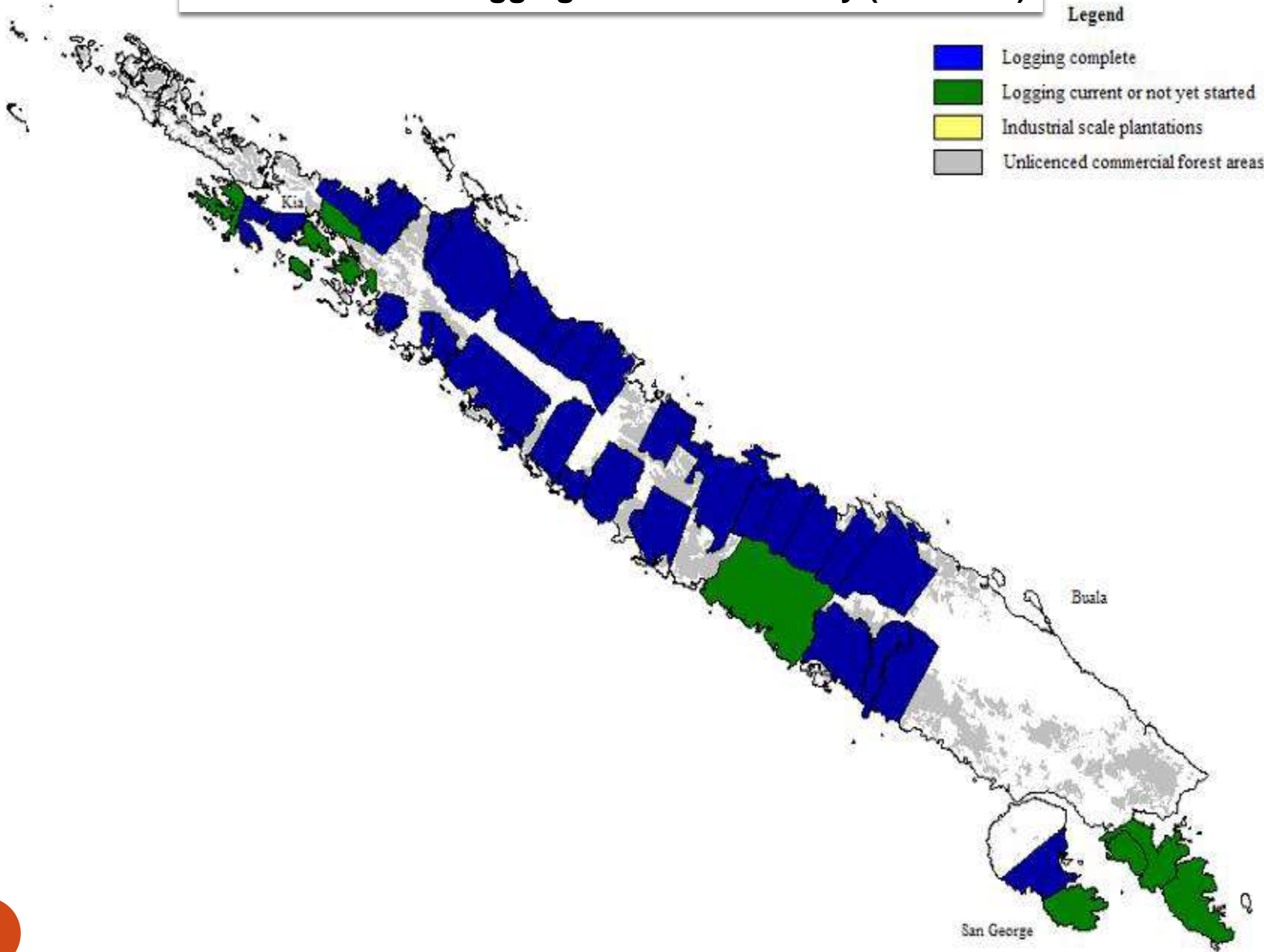


Solomon Islands

Isabel Province- Logging License Summary (Dec 2005)

Legend

- Logging complete
- Logging current or not yet started
- Industrial scale plantations
- Unlicensed commercial forest areas



Tenements

Info. updates to March 2015

Re-categorized attribute fields for consistency

Update on area size, area names, tikinas and province

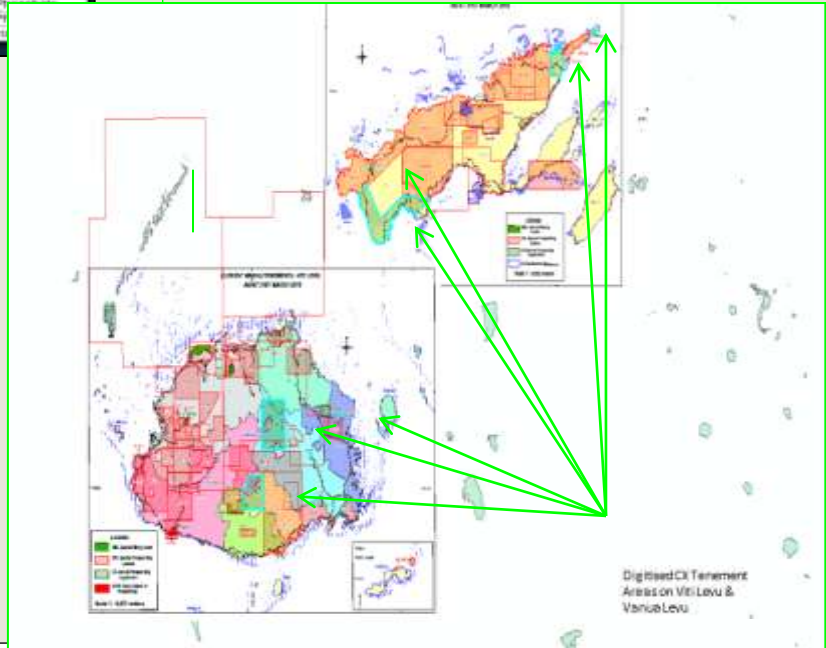
Digitized updated tenements boundaries on Prospective Applications, Special Mining Licenses & Special Prospective Licenses (per updates received from MRD)

FID	Shape	LICENCE	AREA_HA	AREA_SQKM	OF_BLOOR	AREA_NAME	HOLDER	PERCENTAGE	GRANTED	DATE	COMMENTS
0	Polygon	DEL1200	870549	8765	52	Motuka	Aluka Limited	100	21/08/2009	20/08/2014	
1	Polygon	DEL6200	520580	5499	47	Basara Basara	South Pacific Petroleum and	100	8/09/2008	7/09/2013	
2	Polygon	DEL3200	306200	3042	28	Nadi Waters	Aluka Limited	100	21/08/2009	21/08/2014	
3	Polygon	DEL2200	875941	8779	48	Yadua	Aluka Limited	100	21/08/2009	20/08/2014	



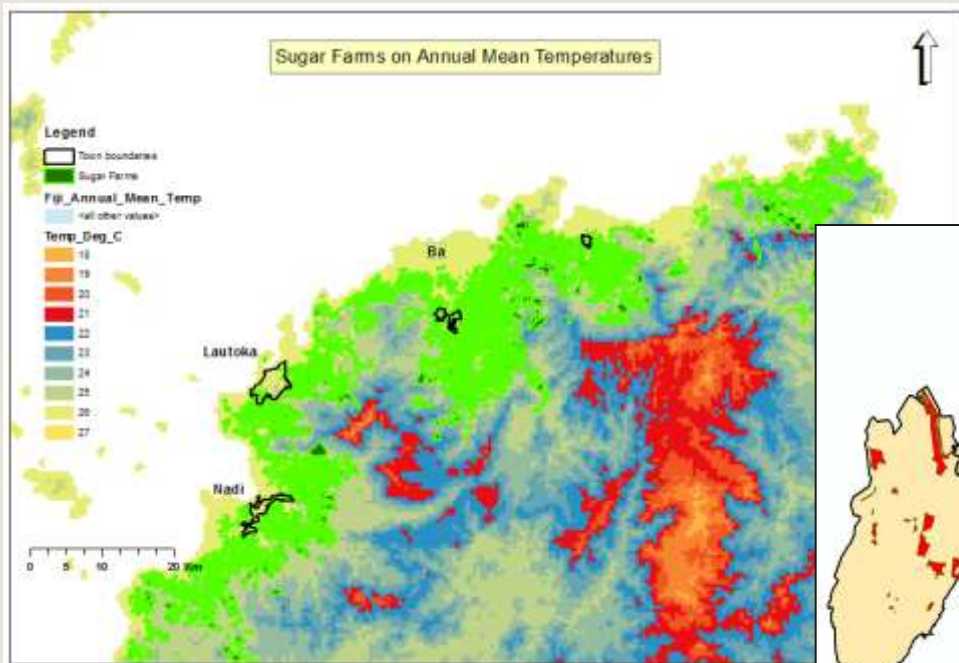
FID	Shape	LICENCE	AREA_HA	AREA_SQKM	OF_BLOOR	AREA_NAME	HOLDER	PERCENTAGE	GRANTED	DATE	COMMENTS	
0	Polygon	SPL1400	1400	1400	14	Lubasa West	Lubasa West	100	0	0	0	0
1	Polygon	SPL1401	1401	1401	14	Lubasa East	Lubasa East	100	0	0	0	0
2	Polygon	SPL1402	1402	1402	14	Lubasa South	Lubasa South	100	0	0	0	0
3	Polygon	SPL1403	1403	1403	14	Lubasa North	Lubasa North	100	0	0	0	0

SPL	ORG	OEL	ACTP	Original Field Aliases	New Field Aliases
				FID	FID
				Shape	Shape
				Licence No.	Licence No.
				Area_Ha	Area_Ha
				Area_Sqkm	Area_Sqkm
				OF_BLOOR	OF_BLOOR
				Area Name	Area Name
				Tikina	Tikina
				Province	Province
				Original Holder	Major Holder
				Producers 2/3/10/20/30	Other Holder
				Date Granted	Granted
				Term Expires	Expiry
				Remarks	Remarks
				TRIG	TRIG
				Status	Status
				Comments	
				Notes	
				Percentage	
				Tenure Type	



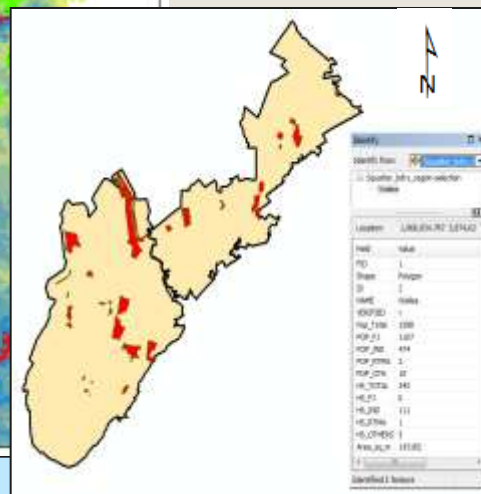
Newly digitised 14 SPL Tenements
Vanua Levu (8)
Viti Levu (6)

Data Analysis – Phase 1

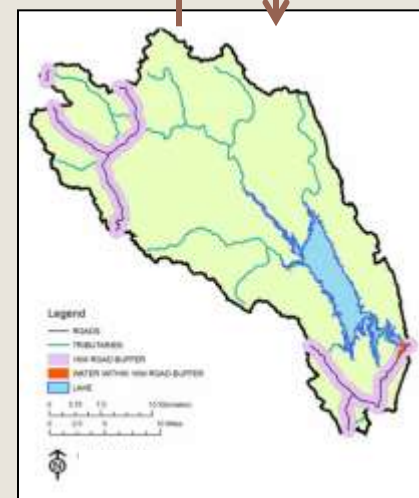
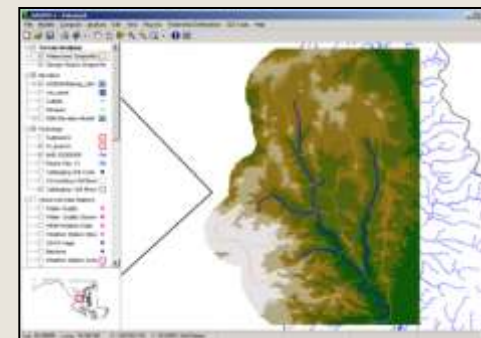


1.

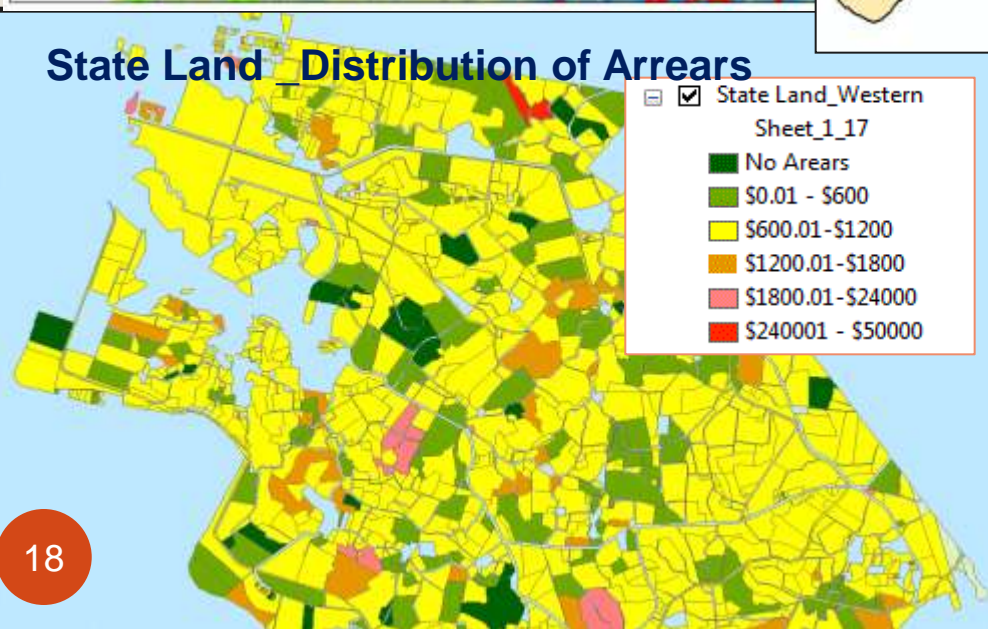
2.



Watershed Analysis

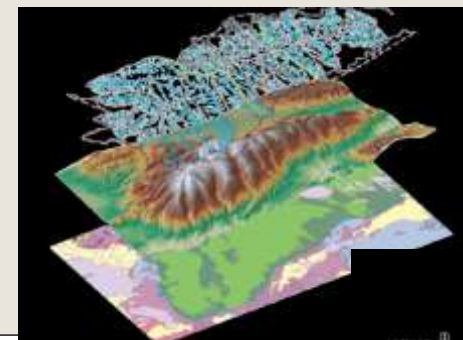


State Land Distribution of Arrears



3.

Terrain Analysis



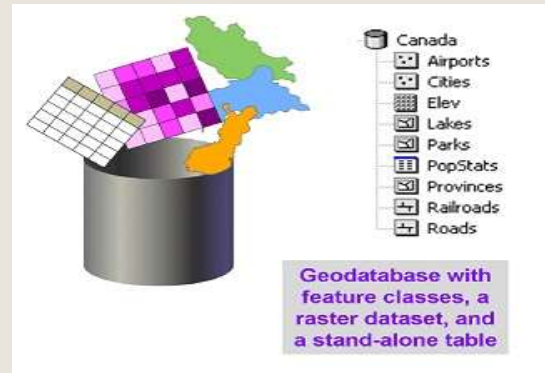
Sugar Industry – Use of GIS Fiji



Data Collection – GPS
ArcGIS / Open Geo Suite



Results
shared with
farmers



Input into
Geodatabase
Data is merged

- Provides accurate production rate during crushing season

Investigate

Produces
MAPS

- Investigate the mills, WebGIS

- Ministry of Lands
- FEA
- Water Authority
- iTaukei Land Trust Board
- Ministry Agriculture



Water Authority – Use of GIS Fiji

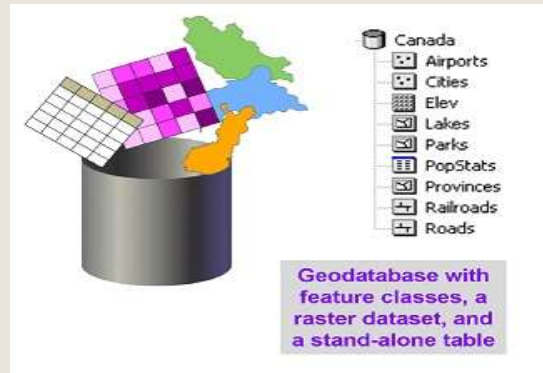


Data Collection – GPS
ArcGIS/Munsys Open
Spatial
Network Analysis



- Water for all!!
- Better farm management
- Preparedness during drought
- Better Irrigation System

Results used for improving services



- Pattern- Relationship Mapping
- Routes / Piping
- Monitoring
- Services and access
- Water Loss
- Hydrology study

- Telecom
- Water
- Sewerage
- Power
- Population
- Municipal Boundaries
- Property Lots
- Roads
- Agriculture

Produces MAPS
WebGIS

Challenges in Geospatial Info for Land Management

- Tight control of government over acquisition of geospatial data (India has a policy that classifies map data as documents of secrecy).
- Modernizing land administration can be challenging due to legacy application issues.
- Lack of local participations / skills
- Data Sharing and Accessibility – ethics on MOU, Executive Order
- Standards and Quality - Lots of different formats of data gathering and storage
- Lots of data everywhere (Data redundancy issue)
- Topological errors in digitization of data
- Many organizations use manual format or different software's
- The issue

Data! Data! Data !! – Management, Access, Storage, Sharing and Use !

How to overcome??

Database Management and Sharing in GIS

An open data and sharing capacity with regulations??

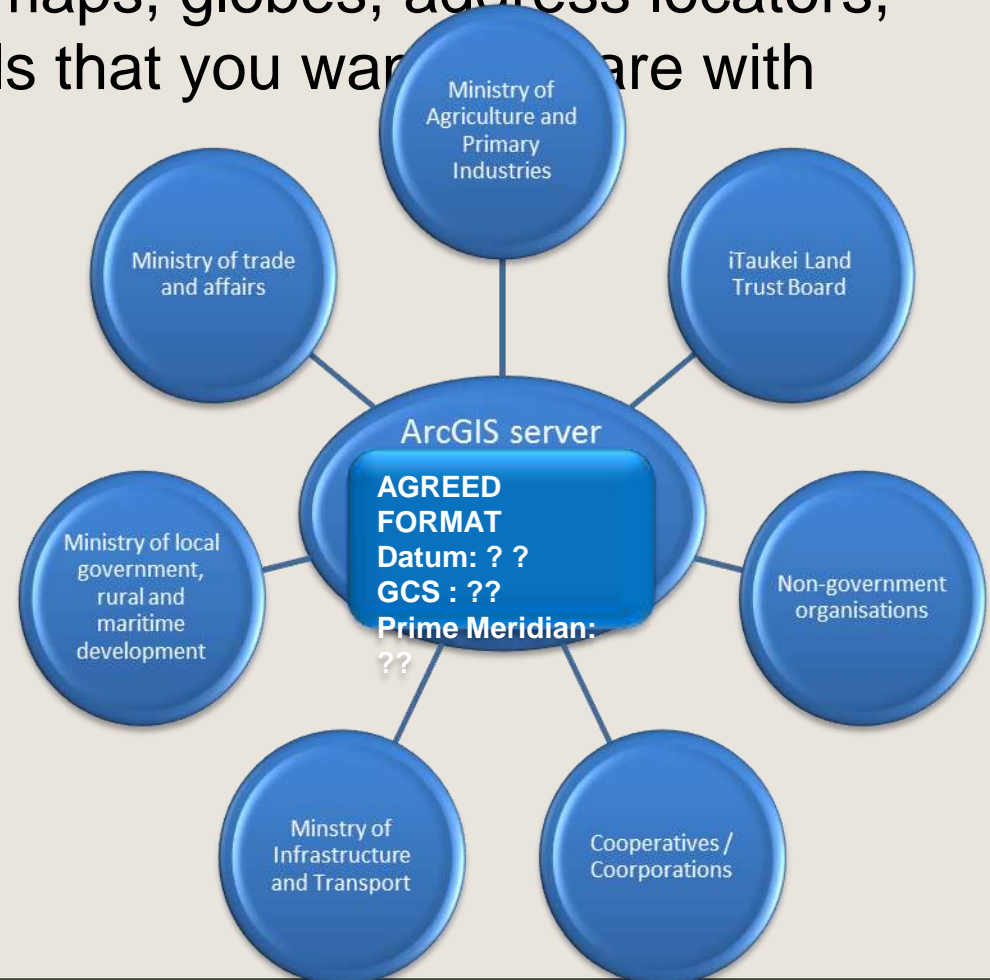
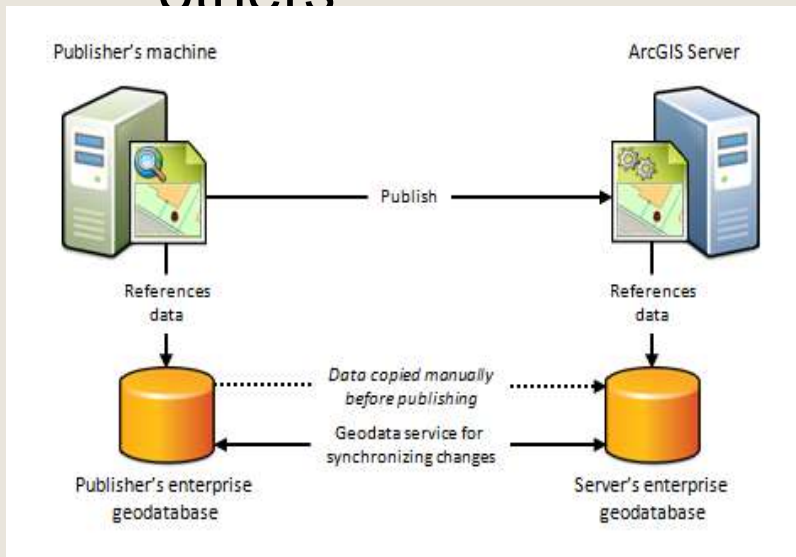
- Enable access to public records – (essential component to keep citizens informed and government accountable)
- Should be available in general public format that government analysts use – Needs to be computer readable and GIS compatible!
- Standardized datum for better sharing
- Reduce redundancy of data collecting and storing
- Need to establish a Server (Central server) that connects the geodatabase of different ministries

Knowledge and skills!!
University of the South Pacific offers this!

Graduates in Land Management & Development and Geo-Spatial Science double major!

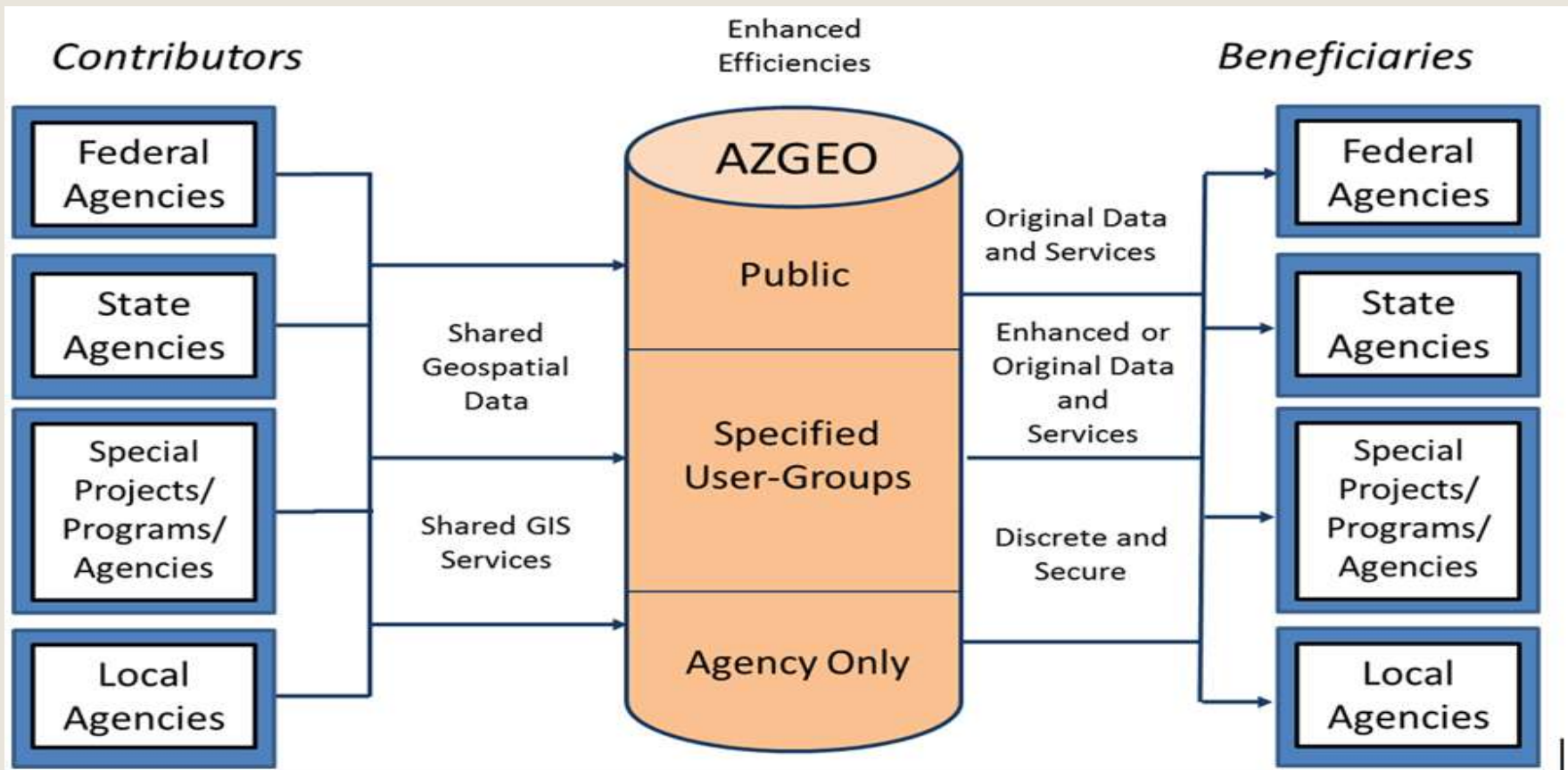
Example: Arc GIS Server

- ArcGIS Server -share your GIS resources across an enterprise and across the web.
- This resources can be maps, globes, address locators, geodatabases, and tools that you want to share with others



Example: AZGEO

- AZGEO is a new statewide initiative administered by the Arizona Geographic Information Council (AGIC); a portal through which governmental users can share data and mapping applications with specified groups.



Innovative GIS Tools & Techniques for Land Administration

- Spatial Economics application – A financial world involvement (Mapping each activity at its spatial location- considerate of time value of money – Spatially)

Applying IBM SPSS Software for Statistical Analysis of the Geography

- Mobile Application – Bring the world geo app to your mobile
- Web Based Maps
- Boundless Geo (Open Geo Suite)

Used by Fiji Water Authority and Sugar Industry

- Possibilities are endless!!
- Ability to examine farm conditions
- Drought – irrigation system
- measure and monitor the impacts of farm management practices

including crop yield estimates, soil amendment analyses, and



Certification of Geospatial Professionals

- For Professional and Ethical Standards, Conduct and Renewal!!
- Transparency and standardization !

GISP –AP CERTIFICATION

- A Portfolio- based program that awards points for education, experience and professional contributions granting certification if the minimum

What is GISP-AP Certification?

Educational Achievement Points	30
Professional Experience Points	60
Contributions to the Profession Points	8
<i>Any category</i>	52
Total Number of Points Required	150

+

4 Years Professional Experience

All is well in the end

- Progress is in the process
- It requires sound understanding and participation
- One Government One Portal (open or not)
- One Fiji One Map
- Land administration can be significantly improved
- Requires Government, Private Sector and Public Support!! And Policy frameworks

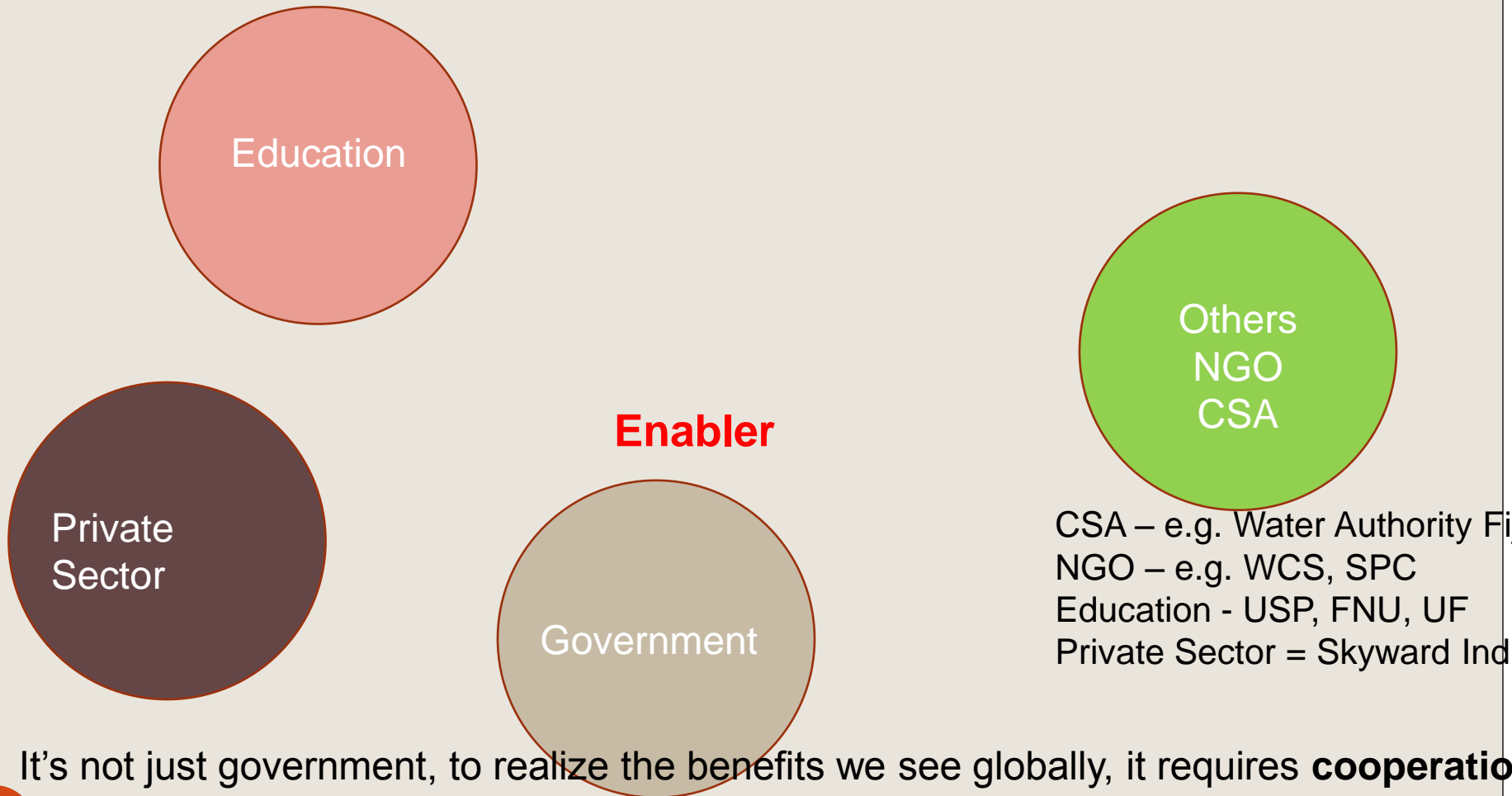
Question with us at the end of the day is - !!

Are we ready and willing to allow this technology to be part of our administration system ??

The answer is dependent on the People !!

The Users, Modelers, Analysts and Data Technicians, Industries and Public!

Working Towards the Next Big Leap



It's not just government, to realize the benefits we see globally, it requires **cooperatio**