“Vegetative Guide & Dashboard” relating atoll agroforestry recommendations to predicted climate and sea level conditions in the Marshall Islands

Katie Friday, S&PF

8/24/15 R5 Directors’ Meeting


worldatlas
Taongi
Marshall Islands
North Pacific Ocean
Bikar
Bikini
Rongelap
Rongerik
Utirik
Taka
Enewetok
Ailinginae
Ailuk
Mejit
Wotho
Jemo
Ujelang
Likiep
Watje
Erikub
Ujae
Lae
Maloelap
Aur
Kwajalein Atoll
Lib
Namu
Jabwot
Ailinglapalap
Majuro
Arno
250 mi
250 km
Jaluit
Mili
Knox
Namorik
Kili
Ebon
CLICK HERE FOR LARGER MAP
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Marshalls forest and people

- 74% forested, of which 85% agroforest
- Coconut, pandanus, breadfruit, and other locally adapted trees and perennials

Photos by John Quidachay

Marshalls forest and people

Pandanus fruit

- Two-thirds of population now on urban Majuro and Kwajelein atolls
- 90% of calories from imported foods – but most vitamins from agroforest foods

Photo by Amateurradiodx

Effects of drought & storms in atolls

Destroyed Taro Plantation from Storm Surge, Salt Water Contamination

Photos by John Quidachay

Wind damage to coconut & breadfruit

Salt-contaminated, abandoned well

Long-term trends and ENSO effects (Marshall Islands)

Variable	Predicted long-term change	Impact on terrestrial ecosystems	
Sea level	Rising	Inundation of soils, salinization of groundwater	
Rainfall	Decreasing (trend) Increasing (model)	+/- drought stress +/- salinization	
Temperature	Increasing	Drought stress	
Storms	More frequent	Inundation, wind damage	

Take-home points:

- Predictive models based on various scenarios, sometimes contradictory, not yet downscaled for the islands

Long-term trends and ENSO effects (Marshall Islands)

Variable	Predicted long-term change	Impact on terrestrial ecosystems	ENSO effect
Sea level	Rising	Inundation of soils, salinization of groundwater	La Niña – high El Niño – low
Rainfall	Decreasing (trend) Increasing (model)	+/- drought stress +/- salinization	Drought with strong El Niño or La Niña
Temperature	Increasing	Drought stress	
Storms	More frequent	Inundation, wind damage	Typhoons with El Niño

Take-home points:

- Predictive models based on various scenarios, sometimes contradictory, not yet downscaled for the islands
- Variability from ENSO > underlying trends (for now)
- Many other trends & impacts > climate change (for now)

Project roles & outputs

NOAA:

- Climatology of precipitation, mapped across Marshalls, broken out by strong/weak/neutral El Niño/La Niña
- Provision of seasonal forecasts, using locally relevant indicators and formats

Collaboration with NOAA = drinking from a fire hydrant

- NOAA needed funding for consultation/communications/adaptation project
- NOAA eager to know precisely what indicators & display formats desired
- Relationships led to additional networking, insights

Project roles:

USGS Pacific Islands Climate Science Center:

offered funding to involve agriculture/agroforestry sector

University of Hawaii: project management & Sea Grant networks

USDA – Pacific Islands Climate Hub (PICH):

- **USFS S&PF** recruited partners including Marshalls state forestry agency, Marshallese student
- **NRCS** improving species parameters in Pacific Islands Area Vegetative Guide (matching species to environment)
- **Land Grant** expertise in cropping systems, nutrition

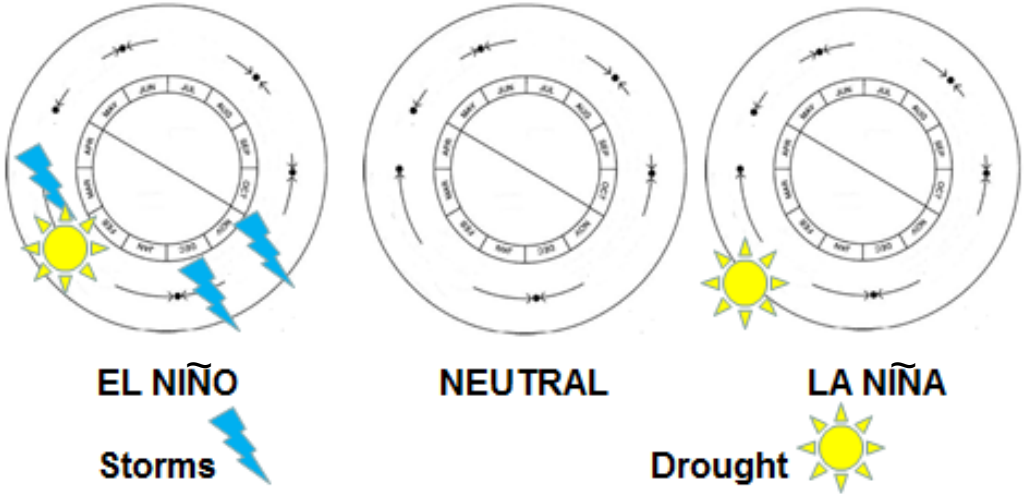
“Design life” – management timeframe

Concept	Recommendation
40-50 years: productive lifespan of coconut	Plant locally adapted drought- and salt-resistant species Plant coastal vegetation / windbreaks
Nutrition for two generations	Promote nutritional values, traditional & modern recipes for local crops
Power of understanding ENSO: at onset of El Niño, can predict • stormy season • drought after 9 months	Plant short-term crops Plan for harvesting & storage

Agroforestry sector outputs:

Calendars describing ENSO patterns:

weather & cropping



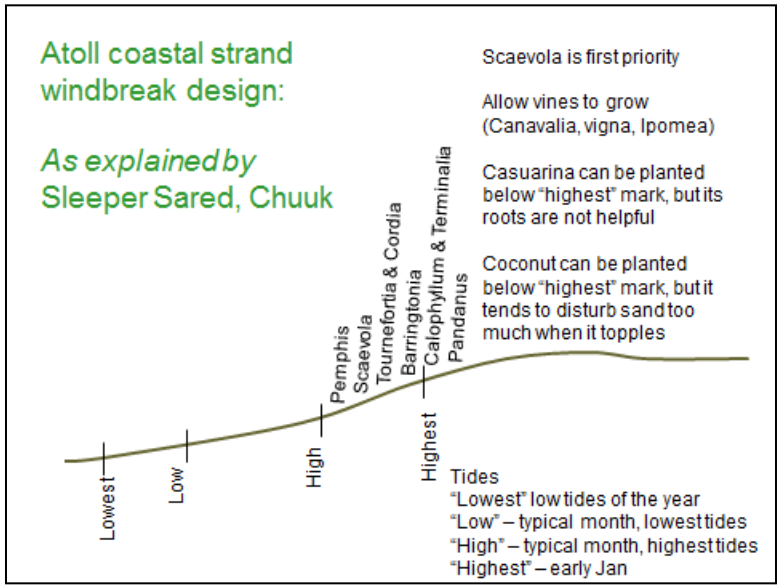
Website/dashboard

- Self-populating seasonal forecasts from NOAA data
- Recommendations
- Downloadable posters & brochures

Tap adaptive traditional practices – interviews, experience from other atolls

Raised beds *(Margie Falanruw)*

Drainage
(John Quidachay)



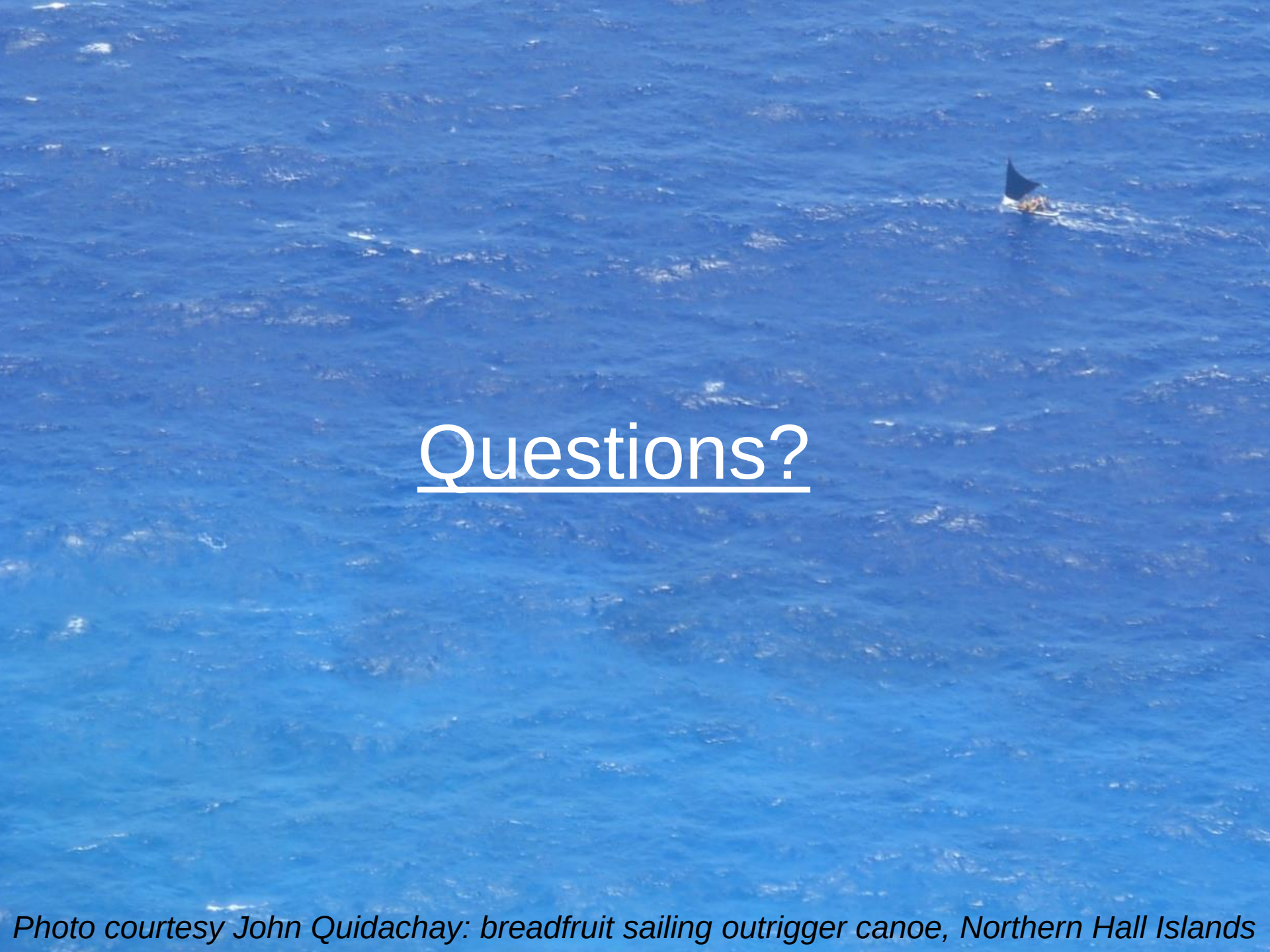


Photo courtesy John Quidachay: breadfruit sailing outrigger canoe, Northern Hall Islands