

Commissioned Papers¹

Assessment of Energy-Integrated Farming Technologies for U.S. Insular Areas (NTIS PB87 142691/AS)

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Cultural Dimensions of Resource Definition and Use in Micronesia (NTIS PB87 142675/AS)

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Tourism Development and Sustainable Renewable Resource Management for U.S.-Affiliated Pacific Islands (NTIS PB87 142725/AS)

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The Development and Management of Nearshore Fisheries in the U.S.-Affiliated Pacific Islands (NTIS PB87 142691/AS)

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Assessment of Livestock Production Technologies in U.S.-Affiliated Caribbean Islands (NTIS 142691/AS)

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Assessment of Agricultural Crop Production Technologies in Puerto Rico (NTIS PB87 142691/AS)

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The Integration of Customary and Traditional Renewable Resource Practices in a Modern Legal Framework (NTIS PB87 142725/AS)

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Tropical Island Ecosystems and Protection Technologies to Sustain Renewable Resources in U.S.-Affiliated Islands (NTIS PB87 142675/AS)

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Organizations Dealing With Renewable Resource Development and Management in Puerto Rico and the U.S. Virgin Islands (NTIS PB87 142675/AS)

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Forestry in Puerto Rico: A Case Study in Successful Organizational Change (NTIS PB87 142700/AS)

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Agriculture Development Needs and Opportunities in the U.S. Virgin Islands (NTIS PB87 142691/AS)**

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Case Studies of the Impacts of Introduced Animal Species on Renewable Resources in the U.S.-Affiliated Pacific Islands (NTIS PB87 142675/AS)

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Traditional Agriculture and Resource Management Systems in the High Islands of Micronesia (NTIS PB87 142683/AS)

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An Analysis of Black Pepper Production in Ponape (NTIS PB87 142683/AS)

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Part A: The Setting for Resource Development NTIS PB87 142675/AS
Part B: Agriculture - Pacific NTIS PB87 142683/AS
Part C: Agriculture - Caribbean NTIS PB87 142691/AS
Part D: Agroforestry and Forestry NTIS PB87 142700/AS
Part E: Aquatic Resources NTIS PB87 142717/AS
Part F: Development Planning Considerations NTIS PB87 142725/AS

(formerly with Pohnpei State Department of Resources & Development)
Aquiculture Development in the U.S.-Affiliated Islands (NTIS PB87 142717/AS)

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 Aquiculture and Fisheries Development in Puerto Rico and the U.S. Virgin Islands (NTIS PB87 142717/AS)

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 Forestry and Agroforestry Technologies: Developmental Potentials in the U.S.-Affiliated Pacific Islands (NTIS PB87 142700/AS)

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The Role of Marine Resource Tenure Systems (TURFS) in Sustainable Nearshore Marine Resource Development and Management in U. S.-Affiliated Pacific Islands (NTIS PB87 142717/AS)

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Implications of History and Culture for Sustaining Development of Renewable Resources on U. S.-Affiliated Pacific Islands (NTIS PB87 142675/AS)

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Impacts of U.S. Military Presence on U. S.-Affiliated Islands (NTIS PB87 142725/AS)

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An Overview of Selected Natural Systems Planning and Management Techniques for U. S.-Affiliated Islands (NTIS PB87 142725/AS)

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Assessment of Commercial Agriculture Technologies for U.S.-Affiliated Pacific Islands (NTIS PB87 142683/AS)

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Coastal Resource Development and Management in the U.S. Pacific Islands (NTIS PB87 142725/AS)

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Assessment of Semiarid Agricultural Production Technologies for the U.S.-Affiliated Caribbean Is-

lands (NTIS PB87 142691/AS)

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The Suitability of Cooperative Enterprises for the Production of Food on the Territorial Islands of the United States (NTIS PB87 142725/AS)

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Aquiculture and Mariculture Development in the U.S. Pacific Insular Areas (NTIS PB87 142717/AS)

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The Marshall Islands Coconut Industry: Prospects for Expansion and Development (NTIS PB87 142700/AS)

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Forestry and Agroforestry Technologies: Development Potentials in U.S.-Affiliated Caribbean Islands (NTIS PB87 142700/AS)

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Effects of U.S. Macroeconomic Policy on Puerto Rico and U.S. Territories (NTIS PB87 142725/AS)

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Commercial Crop Production Technologies and Development Potentials for U.S.-Affiliated Pacific Islands (NTIS PB87 142683/AS)

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Assessment of Food Processing Technologies for U.S.-Affiliated Caribbean Islands (NTIS PB87 142691/AS)

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The Critical Role of the U.S. Congress in Fostering Self-Reliance in the Freely Associated States of Micronesia (NTIS PB87 142675/AS)

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Traditional Crafts in the U.S.-Affiliated Caribbean Islands: An Addendum (NTIS PB87 142725/AS)

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Non-Food Marine Resources Development and

**Management in the U.S.-Affiliated Pacific Islands
(NTIS PB87 142717/AS)**

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**Food and Feed Processing Technologies in the
United States Insular Areas of the Pacific (NTIS
PB87 142683/AS)**

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**Assessment of Livestock Production Technologies
in Micronesia and Feasibility Study for Locally
Produced Pig Feed on Ponape (NTIS PB87
142683/AS)**

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**Applicability of Zeolite Refrigeration Systems to
Small Tropical Islands (NTIS PB87 142717/AS)**

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**Fiscal Incentive Social Support Programs, the
Caribbean Basin Initiative and the Development
of Renewable Resources in Puerto Rico and the
U.S. Virgin Islands (NTIS PB87 142675/AS)**

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**Economic Pests and Pest Management Technol-
ogies Suitable for U.S.-Affiliated Pacific Islands
(NTIS PB87 142683/AS)**

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**Assessment of Agricultural Production Technol-
ogies for U.S. Caribbean Islands (NTIS PB87
142691/AS)**

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**Handicrafts Industry Development and Renewa-
ble Resource Management for U.S.-Affiliated Pa-
cific Islands (NTIS PB87 142725/AS)**

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**Non-Food Marine Resources Development and
Management in the U.S.-Affiliated Caribbean Is-
lands (NTIS PB87 142717/AS)**

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Glossary of Acronyms and Terms

Acronyms

ACIAR	—Australian Centre for International Agriculture Research	FAS	—Freely Associated States (FSM, RMI, and the Republic of Palau)
ADP	—Aquaculture Development Program	FEDA	—Federation Para El Desarrollo Agricola de Puerto Rico
AID	—U.S. Agency for International Development	FIP	—Forestry Incentive Program (USDA)
AMS	—Agricultural Marketing Service (USDA)	FLSA	—Fair Labor Standards Act
ARS	—Agriculture Research Service (USDA)	FSM	—Federated States of Micronesia
CARDI	—Caribbean Agriculture Research and Development Institute	GAO	—U.S. Government Accounting Office
CATS	—Civic Action Teams (U.S. Army)	GDP	—Gross domestic product
CCDC	—Consumer Cooperative Development Corporation	IPM	—Integrated pest management
CFMC	—Caribbean Fishery Management Council	ITC	—Island Trading Company
CNMI	—Commonwealth of the Northern Mariana Islands	ITCZ	—Intertropical Convergence Zone
CODREMAR	—Puerto Rico Corporation for the Development of Marine Resources	ITF	—Institute of Tropical Forestry
COE	—Army Corps of Engineers	IUCN	—International Union for the Conservation of Nature and Natural Resources
CRIS	—Current Research Information System (USDA)	KMR	—Kwajelein Missile Range
CRM	—Coastal Resource Management	MARC	—Micronesian Area Research Center—University of Guam
CVI	—College of the Virgin Islands	MATADC	—Micronesian Area Tropical Agriculture Data Center—University of Guam
CZMA	—Coastal Zone Management Act	MMDC	—Micronesian Mariculture Demonstration Center
CZMP	—Coastal Zone Management Program	MSL	—Marine Systems Laboratory (Smithsonian Institution)
DAWR	—Guam Division of Aquatic and Wildlife Resources	MSY	—Maximum sustainable yield
DHHS	—U.S. Department of Health and Human Services	NEA	—National Endowment for the Arts
DOD	—U.S. Department of Defense	NELH	—Natural Energy Laboratory of Hawaii
DWI	—Danish West Indies	NEPA	—National Environmental Policy Act
DWIC	—Danish West India Company	NOAA	—National Oceanic and Atmospheric Administration (USDOC)
EFD	—Engineering Field Divisions (U.S. Army)	NPS	—National Park Service (USDOI)
EIS	—Environmental Impact Statement	OTEC	—Ocean thermal energy conversion
EPA	—Environmental Protection Agency	OTIA	—Office of Territorial and International Affairs (USDOI)
ERS	—Economic Research Service (USDA)	PBDC	—Pacific Basin Development Council
FAD	—Fish aggregation device	PFDF	—Pacific Fisheries Development Foundation
FAO	—Food and Agriculture Organization (United Nations)	PIDP	—Pacific Islands Development Program

RAMA	—Resource Assessment Marianas Archipelago database
RMI	—Republic of the Marshall Islands
SAC	—Strategic Air Command
SCS	—U.S. Soil Conservation Service (USDA)
SFCA	—Saipan Farmer's Cooperative Association (CNMI)
SPC	—South Pacific Commission
SPREP	—South Pacific Regional Environmental Programme (SPC)
TURF	—Traditional use rights in fisheries
TTPI	—Trust Territory of the Pacific Islands
UGML	—University of Guam Marine Laboratory
USAF	—U.S. Air Force
USCC	—United States Commercial Company
USDA	—U.S. Department of Agriculture
USDOC	—U.S. Department of Commerce
USDOI	—U.S. Department of the Interior
USFS	—U.S. Forest Service (USDOI)
USFWS	—U.S. Fish and Wildlife Service (USDOI)
USGS	—U.S. Geological Survey (USDOI)
US-MAB	—U.S. Man and the Biosphere Program
USN	—U.S. Navy
USNMFS	—U.S. National Marine Fisheries Service (USDOC)
USVI	—U.S. Virgin Islands
VIBR	—Virgin Islands Biosphere Reserve
VICORP	—Virgin Islands Corporation
VIRMC	—Virgin Islands Resource Management Cooperative
WESTPACFIN	—Western Pacific Fisheries Information Network
YINS	—Yap Institute of Natural Science

Terms

Agouti: A rabbit-sized rodent indigenous to the U.S.-affiliated Caribbean islands; believed to have been extirpated during the colonial period.

Agedados: Puerto Rican sharecroppers on hacienda land.

Agroecosystem: An ecosystem manipulated for agricultural purposes.

Agroforestry: Collective term for a number of agricultural production systems that incorporate a mixture of annual, perennial, and woody perennial species, sometimes including animals, on the same land management unit.

Aiga: A social landholding unit in American Samoa.

Algal ridge: An algae-covered ridge that forms on the shallow surface of coral reefs.

Algal turf: A flatbed of densely growing algae; also used to describe macroalgae-covered screens used as part of crab mariculture in the Caribbean.

Alley cropping: A form of agroforestry involving planting tree species in rows, with annual crops planted in the alleys or avenues. Also called *Avenue cropping*.

Alluvium/ Alluvial soil: Clay, silt, sand, gravel, or similar detrital material deposited by running water.

Aquifer: A water-bearing stratum of permeable rock, sand, or gravel; often used to refer to the Ghyben-Herzberg lens common to islands.

Artificial reef: An artificial structure placed in nearshore waters to encourage the settlement and growth of reef community species such as hard corals, mollusks, crustaceans, echinoderms (e.g., sea urchins), fish, and marine plants.

Avenue cropping: A form of agroforestry involving planting tree species in rows, with annual crops planted in the avenues or alleys. Also called *Alley cropping*.

Back-reef: The nearshore side of the reef.

Bauxite: An impure soil mixture of aluminum compounds largely devoid of common plant nutrients.

Bedding planes: Flat surfaces in sedimentary rocks along which adjacent beds tend to separate

Benthic: Of, referring to, or related to, the bottom of a body of water, such as the ocean.

Biophysical: The natural (biological and physical) attributes of a site and their interrelationships; a biophysical assessment involves assessing these attributes for their suitability for various uses.

Biosphere reserve: A form of protected area designed to integrate conservation efforts with research, monitoring, and education activities, traditional landuse and local socioeconomic needs. The typical reserve is comprised of a highly protected core area, an experimental research area, a rehabilitation area, a traditional use area, and a cooperative development area.

Boom-and-bust syndrome: A cyclic process in which: 1) a new resource or market for a resource is discovered offering opportunities for profit, 2) numerous entrepreneurs begin to produce the desired product eventually flooding the market

- and driving down the price, and 3) the subsequent loss of profit-making opportunities results in entrepreneurial flight and collapse of the industry.
- Bund:** An embankment used to control the flow of water.
- Bycatch:** Miscellaneous marine species caught in addition to the desired species at which primary fishing efforts are directed.
- Caique:** Caribbean Indian chieftain.
- Capillary forces:** Surface tension force that acts to draw water upward in small openings.
- Ciguatoxins:** Toxin found in nearshore tropical marine fish, currently believed to be linked to sediment discharge from nearby terrestrial areas.
- Copra:** Dried coconut meat yielding coconut oil.
- Conuco:** Traditional Caribbean cultivation system involving interplanting of root crops in mounds of soil.
- Convective precipitation:** Precipitation generated from condensation of moisture laden air that has risen due to surface heating.
- Corm:** A common name referring to the tuber of a number of root crops including yam (*Dioscorea* spp.) and taro (*Colocasia* spp.).
- Cruzan:** Inhabitant of the island of St. Croix, U.S. Virgin Islands.
- Curio:** Something considered novel, rare, or bizarre.
- Cyclones/ cyclonic storms:** A system of winds or storm that circles around a center of low atmospheric pressure clockwise in the southern hemisphere and counterclockwise in the northern hemisphere, advances at a speed of 20 or more miles per hour, and often brings abundant rain; also called a hurricane.
- Desacomodados:** Squatters on Crown land in 18th century Puerto Rico.
- District Center:** Administrative centers established for the government of the Trust Territory of the Pacific Islands, which now comprise the major urban centers of the Commonwealth of the Northern Mariana Islands, the Republic of the Marshall Islands, the Federated States of Micronesia, and the Republic of Palau.
- Diurnal:** Of, relating to, or occurring in the daytime; having a daily cycle.
- Ecosystem:** The sum of biotic and abiotic components of a specific environment.
- Endemic:** Having evolved in or restricted to a locality or region.
- Epiphyte:** A plant that derives its moisture and nutrients from the air and rain and usually grows on another plant.
- Evapotranspiration:** Removal of water from the soil through the combined processes of evaporation and transpiration.
- Externalities:** A direct, commonly adverse, effect of an action (e.g., pollution) that affects another's welfare but that is not reflected in market prices or is not taken into account by the individual, firm, or group causing the externality in deciding to undertake the action.
- Extinct:** No longer existing.
- Extirpate:** To remove completely from a particularly area or region, but not completely removed from the Earth.
- Fa'a Samoa:** Traditional lifestyle and social structure of American Samoa ("the Samoan Way").
- Fiafia:** Traditional Samoan Sunday feast.
- Fissures:** A narrow opening or crack in rocks.
- Fono:** Governing council of American Samoan village.
- Fore-reef:** The seaward side of the coral reef.
- Free association:** A form of legal association between the United States, the Republic of the Marshall Islands, the Federated States of Micronesia, and expected in the near future between the U.S. and the Republic of Palau, in which the Freely Associated States have full control over their internal and external affairs and will receive U.S. funding over a specified period while the United States retains security and defense responsibilities.
- Fumaroles:** A small opening in rock associated with recent volcanic activity from which hot gases and vapors issue.
- Ghyben-Herzberg lens:** The lens-shaped freshwater-saturated zone formed as freshwater percolates down through island soils. This freshwater zone is confined in a general lens shape by the surrounding denser seawater.
- Green manure:** Green plant material that is incorporated into the soil as a means to enhance soil fertility.
- Groundwater:** Water that occurs in pores and cracks of rocks and sediments in the wholly saturated zone below the Earth's surface.
- Guano:** A phosphate-rich substance composed chiefly of the excrement of bats or seafowl and used as a fertilizer.
- Hacienda:** A large estate, often devoted to such agricultural pursuits as cattle ranching.
- Hermatypic coral:** Reef-building corals able to grow to a maximum depth of approximately 150 feet below sea level.
- Humus:** A complex soil resulting from partial decomposition of plant or animal matter and forming the organic portion of soil.
- Hydrophyte:** A plant growing in water or in soil too waterlogged for most plants to survive.
- Hydroponics:** Culture of plants in nutrient solutions

- with or without an inert medium to provide mechanical support.
- Intercropping:** The planting of two or more crops together at the same time by row, strip, or in a seemingly random mixture.
- Interplant:** To plant a crop between plants of another kind.
- Intertidal:** Of, relating to, or being part of the littoral zone between the high- and low-tide marks.
- Jibaros:** Puerto Rican peasants in late 18th century colonial agricultural economy.
- Lancho:** A rural, generally wooded, farm that urban dwellers in the Mariana islands traditionally used to cultivate a number of food crops and maintain livestock such as chickens and pigs.
- Lithology:** The study of rocks, or the character of a rock formation.
- Littoral:** Of, relating to, or situated in or near a shore, especially the shore zone between low and high water marks.
- Macroalgae:** Large, chiefly aquatic, nonvascular plants, especially seaweeds.
- Matai:** Titled chiefs in American Samoa.
- Meristematic tissue:** Plant tissue capable of forming a replicate of the original plant given appropriate growth conditions.
- Microhabitat:** The environment immediately surrounding the organism of interest.
- Midden:** A refuse heap; commonly analyzed in archaeology to provide information on prehistoric lifestyles.
- Mongoose:** Predator introduced to the U.S. Virgin Islands in the early colonial period and presumed responsible for extermination of local fauna, particularly the agouti.
- Monoculture:** The cultivation of a single product to the exclusion of other uses of a unit of land.
- Muck:** Highly organic, wet soils; typical of taro pits and mangrove swamps.
- Mwarmwar:** Head ornaments similar to leis and typically made of fragrant flowers and leaves, such as ylang-ylang, worn in the Caroline islands.
- Naborias:** Caribbean Indian lower class, generally laborers,
- Neo-tradition:** An elaboration or adjustment of a traditional practice.
- Nitainos:** Caribbean Indian higher class.
- Ordnance:** Military supplies, including weapons, ammunition, combat vehicles, and maintenance tools and equipment.
- Orographic precipitation:** Rainfall generated as moisture laden air is forced to rise over a topographic feature, most commonly mountains.
- Overexploitation:** Exploitation of a resource at greater than sustainable levels.
- Pelagic:** Of, related, to or living in the open sea; oceanic.
- Pneumatophores:** A root often functioning as a respiratory organ in marsh or swamp plants such as mangroves.
- Polyculture:** Agricultural production system incorporating a diversity of plant species and varieties concurrently on a unit of land.
- Reef flat:** The shallow reef area between the coral reef and shoreline.
- Relay cropping:** Planting a second crop prior to the harvest of the initial crop on a unit of land.
- Savanna:** A tropical or subtropical grassland containing scattered trees and drought-resistant undergrowth.
- Sawei:** A historical socioeconomic exchange system between Yap and nearby outer islands.
- Scuba [self-contained underwater breathing apparatus]:** Apparatus used for breathing while swimming under water.
- Sedimentation:** The process of deposition of usually fine-grained sediment; settling. Excessive sedimentation in nearshore waters can smother nearshore marine bottom communities and kill corals.
- Slumps:** Small landslides in sloping areas of highly weathered soils, common to degraded insular lands.
- Snorkeling:** To swim partly submerged and breathing through a tube.
- Solution cavities:** Various sized openings in rock formed through the dissolving action of water.
- Subsistence farming:** A system of farming that provides all or almost all the goods required by the farm family usually without any significant surplus for sale.
- Swidden:** A form of land clearing involving slashing standing vegetation and, commonly, burning it onsite to provide soil nutrients (also called slash-and-burn clearing).
- Terrane:** The area or surface over which a particular rock or group of rocks is prevalent.
- Thalli:** The fleshy portions of a plant, especially marine macroalgae.
- Theca:** The solid structure formed by reef-building coral polyps.
- Traditional:** Relating to indigenous, pre-western contact systems.
- Trusteeship:** Supervisory control by one or more countries over a trust territory.
- Tsunami:** Seismic sea wave; a great sea wave produced by submarine earth movement or volcanic eruption.
- TURF [traditional use rights in fisheries]:** Systems of limited access to marine resources practiced traditionally in the U.S.-affiliated Pacific islands.

Underutilized/underused: To utilize less than fully or below the sustainable maximum yield.

Water table: The top surface of the groundwater zone.

Watershed: A region or area draining into a par-

ticular watercourse or body of water; a fundamental ecological unit for resource development planning,

Weir: A fence or enclosure set in a waterway for taking fish,