Treatment Option Case Study - Hawaii

(proposed management system)

Conservation Effects Worksheet

Truck Crop - Cabbage

(land use and crop)

Resource Setting:

Maui, Hawaii

Soils - Keahua series - fine kaolinitic isohyperthermic Torroxic Haplustolls, 3-25% slope, 73°F mean temperature, clobbly structure, well drained, medium runoff, moderate permeability, 60+in. deep

Elevation - 600-1500 ft. 3.

Rainfall - 20 in.

Wind - high velocity area.

Average Air Temperature - 80°F

Growing Season - continual

Irrigation Availability - 5/8-2 in.

Natural Vegetation - buffelgrass, feather fingergrass, ilima, kiawe, lantana, pitted beardgrass, redleg grass, uhaloa, hale koa.

Air - minimal cane fire and volcanic emission pollution.

Animals - deer, chukars, pheasant, dove, francolin.

Conservation Treatment Results:

Environmentally sensitive, economically viable vegetable production system. Prudent, conservative herbicide, pesticide, nutrient and irrigation water use. Acceptable water and air quality levels

Soil erosion rates less than 5 tons per acre

Surface runoff minimized and channeled into natural waterways

Wind erosion and plant damage minimized

Native plant and wildlife populations not exceed/ are not below ecosystem carrying capacity.

Resource Problems Before Treatment:

Soil erosion and surface runoff.

Insufficient irrigation and nutrient application.

Weed and insect control.

Low yield

Labor

ACTIONS (Kinds, Amounts, Timing)	**EFFECTS** (Effects of Continuing Bench System)
Land Preparation	
Land Smoothing (466) - Have conservation plan before bull dozing begins. - Mover correct amount of soil	Wind erosion minimized when opening land. Provides more uniform planting, cultivation, and irrigation Improves drainage Facilitates farming on terraces/contour
Chiseling and Subsoiling (324) - Rip 4 - 10 in. below layer. - Across slope if <6% slope - On contour if >6% slope	Breaks compaction layer Enhances water percolation Aerates soil Promotes microbiological activity Rooting zone = 1.5 feet
Contour Farming (330) Install on moderately sloping field (<2% slope) when planting	Channels runoff from field Conserves soil moisture
Terraces (600) - Design for slopes (<20%) - horizontal spacing based on multiples of tractor boom width. - channel slopes at non-erosive velocity rate (<4.5 f/s). - Install immediately after harvest.	Reduces erosion by shortening slope length. - channel grades (<3%) slow runoff Conserves soil moisture by reducing/channeling runoff.
Stripcropping (586) Plant crop and grass or close growing plants in alternating strips.	Controls erosion and conserves moisture. Prevents insect/disease spread. Provides wildlife food and cover.
Diversion (362) - Channels velocity not to excess 9 ft/s when grassed - Plant recommended grass species	Diverts runoff from field Grass slows water velocity; conserves and filters water
Grassed Waterway (412) - Maximum velocity between 5-9 ft./s. - Plant recommended grass species.	Conveys runoff from water concentrated area. Provides wildlife food and cover. Grass slows water velocity, conserves and filters water.

ACTIONS (Kinds, Amounts, Timing)	**EFFECTS** (Effects of Continuing Bench System)
Critical Area Planting (342) Plant recommended species	Plants slow water velocity, conserve and filter water, serves as barrier to insect and disease spread and pesticide drift. Provides wildlife food and cover.
Field Windbreak (392) **Hedgerow Planting** (422)	Reduces wind erosion and plant damage. Reduces evapotranspiration rates. Increases irrigation efficiency. Serves as barrier to insect and disease spread and pesticide drift. Provides wildlife food and cover.
Filter Strip (393) Locate at lower field edge, above terraces/ diversions or adjacent to gullies, streams, and ponds.	Removes sediment and pollutants from runoff.
Field Border (386) Seed pasture/grass strip at least 16 ft. wide.	Protects field edges as machinery "turn around" areas. Provides wildlife food and cover.
Crop Management	
Irrigation Storage Reservoir (436), **Water Conveyance** (430**), Water Management** (449), and **System** (441& 442).**Irrigation** (continued) - Design based on: - peak crop consumptive use (1.5 ft extraction depth, peak consumptive use coefficient = .8-.85; - Site factors (evaporation, topography, available water capacity = 0.105 in./in., water meter size and pressure); - equipment efficiency, preference, cost and availability. - Install before planting	Collects, applies and conserves irrigation water effectively. Matches irrigation system user needs with environment.

ACTIONS (Kinds, Amounts, Timing)	**EFFECTS** (Effects of Continuing Bench System)
Nutrient Management (590) Apply based on yearly soil and tissue analysis for each field. - Avoid blanket recommendations - Record applications and effects - Select material based on plant uptake, soil fixation via green manures, soil-water relations, irrigation system, and availability - Apply correctly - Correct application rate if leaching and over fertilization are evident - Use lime where pH is low - Use non-petrochemical materials for organically-grown produce.	Economically supplies plant nutrient for optimum yield. Minimizes entry of nutrients to surface and ground water. Maintains soil fertility and biological activity.
Composting Facility (317) Recycles organic materials - Types: aerated windows, static piles, and invessel.	Produces humus-like material. - Useed as soil amendment/fertilizer. - Reduces fertilizer requirements. - Environmentally sound.

ACTIONS (Kinds, Amounts, Timing)	**EFFECTS** (Effects of Continuing Bench System)
Pest Management (595) Use Integrated Pest Management. - Investigate feasibility of non-chemical controls. - crop rotation - trap crops - misting. - predator/parasites - barriers.	Apply pest control in most cost effective manner. Controls target organisms with minimal effect to non-target organisms and environment.
- Apply pesticides when applicable, needed and feasible. - Determine based on economic thresholds. - Use only pesticides registered for specific crop being treated.	Pests will not develop specific pesticide resistance.
- Use stickers to reduce drift	Reduces potential for leaching and surface/ground water.
- Apply when low wind velocity.	Avoids windborne drift.
- Alternate pesticides	Pests will not develop resistance to specific pesticides
- Apply with utmost care	
Post Harvest	
Conservation Cropping Sequence (328) - Select green manure/vegetable crops compatible with farming operations and environment. - Limit tillage to essential operations.	Reduces erosion and surface runoff Increases soil fertility, structure, and waterholding capacity. Breaks disease and pest cycles.

ACTIONS (Kinds, Amounts, Timing)	**EFFECTS** (Effects of Continuing Bench System)
Cover and Green Manure Crop (340) Select environmentally adaptable crop with growth equal fallowing time. Work residue into soil and plant immediately after harvest. - Apply fertilizer/lime based on soil analysis before and during growth. - Irrigate when needed. - Incorporated when crop is immature.	Controls erosion during periods when soil is not producing crop. Adds organic matter to soil. Affects water budget. - Infiltration, percolation, and aeration improved. - Filters movement of sediment, pathogens and pesticides
Mulching (484) Apply plant residues and other materials not produced in field.	Same as cover crop (above)

Comments:

Actions will vary among farmers.