SOUTH
TECHNICAL
SERVICE
CENTER

# TECHNICAL NOTE

Subject: **ECONOMICS**

Series No.: **607**

Reference: **Method of Computing and Recording Cost Estimates For Conservation Measures**

Date: **October 1980**

4-36888 11-80
USDA—SCS—FORT WORTH, TEXAS 1980

SOIL CONSERVATION SERVICE
U. S. DEPARTMENT OF AGRICULTURE

2-58-4

STSC TECHNICAL NOTE 607

RE: METHOD OF COMPUTING AND RECORDING COST ESTIMATES FOR CONSERVATION MEASURES

Several methods are being used to compute and record costs for conservation measures. Each may be quite accurate and useful to individuals. This technical note provides a suggested format and procedure that may be more useful to STSC area states. The technique may be used in field offices for ready reference when working with land owners and may be used in making economic evaluations of alternative resource management systems for the accelerated land treatment parts of project plans.

The method described herein includes the development of flat rate cost estimates similar to those used by auto repair shops. The flat rate costs may be prepared at the state, area or field office level as most appropriate. When state or area estimates are provided to field offices applicable adjustments should be made to tailor them to represent local situations. The rates should be revised at least yearly to keep them current. The flat rate schedules may be used as a part of Section V of field office technical guides.

The flat rate schedules list conservation practices and provides a format for determining the annual cost for each practice. Other practices may be needed for local situations. This information can be used for evaluating alternative resource management systems. It is not intended for use in estimating the cost of applying a particular practice on a particular site at a particular time.

Definitions and assumptions used for column headings -

1. Conservation Practice - The name of the practice as shown in Section IV of the technical guide.

2. Indicator Unit - The unit that accounts for variability in the cost of the practice related to size. For example, in planting a pasture, the factor that accounts for the most variation is the number of acres to be planted. The indicator unit may be expressed in terms of 1,000 cu yds or 1,000 ft to avoid very small numbers in the total annual costs column. For example, if the annual cost of 1,000 feet of diversion is $88 per 1,000 feet, it may be easier to use $88 per 1,000 feet than $.088 per foot.

3. Flat Rate Installation Cost Per Unit - The cost of all materials, labor and equipment needed to satisfactorily perform or install the conservation practice according to the specifications shown in Section IV should be included.

The "rate" should be based on average sized jobs done by experienced contractors, operators and vendors. It should include non real estate taxes, insurance, safety equipment, and other items ordinarily included as overhead costs.

The "rate" need not include costs for the land on which the practice is to be performed or installed or any other costs commonly associated with real estate such as, taxes and interest.

The "rate" should be based on quoted price lists, actual costs experienced by SCD cooperators, published research by State universities and Federal agencies, and judgment of SCS personnel.

Some practices such as Grade Stabilization have an extremely wide range of installation costs. In these cases, the indicator unit is shown as "job estimate." For these practices, the installation cost must be estimated on a job basis. The annual cost is then estimated to be proportional to the cost listed. For example, if the total annual costs of a grade stabilization structure is listed in the flat rate schedule as $115 per job with a job estimate of $1,000, the annual cost of a $500 job would be one-half or $57.50 per job.

The actual cost to the cooperator will also depend on the amount of cost-share assistance available at the time he decides to install the practice.

Other factors affecting the actual cost to the cooperator include the interest rate he must pay if borrowed money is used, his tax situation in any given year, the availability of used materials, and many others.

4. Lifespan - A standardized lifespan for each practice should be selected. Considerations used in determining the lifespan are the number of years the practice is ordinarily designed for, a reasonable period for the land user to recover his investment, and the possibility of obsolescence. For these reasons, only a few practices may have lifespans exceeding 25 years. The commitment of resources for the lifespan is an important planning decision.

5. Annual Operation and Maintenance Costs - Operation and maintenance costs are for use in determining annual costs of those conservation practices with a lifespan of more than a year. These costs should be based on the expected jobs needed to maintain the practice.

6. Total Annual Cost - This column combines the installation cost amortized at the rate the cooperator (landowner or operator) must pay if borrowed money is used and the operation and maintenance costs. It will be necessary to use the same interest rate for all practices in order to provide a true comparison of alternative resource management systems.

7. Local Annual Costs - This column is provided for recording local annual costs, if better information is available locally.

Thomas C.G. Hodges
Agricultural Economist

W. Richard Folsche
Head, Planning Technology Staff

Attachment

# FLAT RATE SCHEDULE-CONSERVATION PRACTICES

| Conservation Practice | Indicator Unit | Flat Rate Install. Cost $ | Life-span YRS. | Annual O&M Costs % | Total Annual[1/] Costs $ | Local Total Annual Costs $ |
|---|---|---|---|---|---|---|
| Access Road[1/] (one-way traffic) | | | | | | |
| Gravel | Ft | | | | | |
| Blacktop | Ft | | | | | |
| Pavement | Ft | | | | | |
| Access Road[1/] (two-way traffic) | | | | | | |
| Gravel | Ft | | | | | |
| Blacktop | Ft | | | | | |
| Pavement | Ft | | | | | |
| Bedding | Acre | | | | | |
| Brush Management | | | | | | |
| Mechanical | | | | | | |
| Red Cedar | | | | | | |
| Light | Acre | | | | | |
| Moderate | Acre | | | | | |
| Severe | Acre | | | | | |
| Chemical | Acre | | | | | |
| Channel Vegetation | Acre | | | | | |

[1/] Bridges and culverts not included.

| Conservation Practice | Indicator Unit | Flat Rate Install. Cost $ | Life-span YRS. | Annual O&M Costs % | Total Annual Costs $ | Local Total Annual Costs $ |
|---|---|---|---|---|---|---|
| Chiseling and Subsoiling | | | | | | |
| Chiseling | Acre | | | | | |
| Subsoiling | Acre | | | | | |
| Clearing and Snagging | Job Est. | | | | | |
| Commercial Fish Ponds | Job Est. | | | | | |
| Conservation Cropping System - See individual practices used in the system. | | | | | | |
| Contour Farming | Acre | | | | | |
| Cover & Green Manure Crop | Acre | | | | | |
| Critical Area Planting | | | | | | |
| Shaping | Acre | | | | | |
| Cover Crop | Acre | | | | | |
| Seed, Seeding, and Fertilizer | Acre | | | | | |
| Mulching | Acre | | | | | |
| Sodding | 1,000 sq yds | | | | | |
| Crop Residue Use | Acre | None | Annual | | None | |

| Conservation Practice | Indicator Unit | Flat Rate Install. Cost $ | Lifespan YRS. | Annual O&M Costs % | Total Annual Costs $ | Local Total Annual Costs $ |
|---|---|---|---|---|---|---|
| Dam, Diversion | Job Est. | | | | | |
| Dam, Floodwater Retarding | Ac Ft Storage | | | | | |
| Dam, Multiple Purpose | Job Est. | | | | | |
| Deferred Grazing | Job Est. | | | | | |
| Dike | | | | | | |
| Class I | 1,000 cu yd | | | | | |
| Class II | 1,000 cu yd | | | | | |
| Class III | 1,000 cu yd | | | | | |
| Diversion ( ¢ a cu yd) | 1,000 ft | | | | | |
| Drainage Land Grading | Acre | | | | | |
| Emergency Tillage | Acre | | | | | |
| Farmstead and Feedlot Windbreak | | | | | | |
| Bare rootstock | 1,000 trees | | | | | |
| Potted rootstock | 1,000 trees | | | | | |

| Conservation Practice | Indicator Unit | Flat Rate Install. Cost $ | Lifespan YRS. | Annual O&M Costs % | Total Annual Costs $ | Local Total Annual Costs $ |
|---|---|---|---|---|---|---|
| Fencing | | | | | | |
| Four wire barb | Mile | | | | | |
| Woven wire and barb | Mile | | | | | |
| Suspension | Mile | | | | | |
| Field Border (1 rd wide) | 1/2 Mile | | | | | |
| Field Windbreak | | | | | | |
| Bare rootstock | 1/2 Mile | | | | | |
| Potted stock | 1/2 Mile | | | | | |
| Firebreak | | | | | | |
| Grass | 1/2 Mile | | | | | |
| Bare Soil | 1/2 Mile | | | | | |
| Fish Raceway | Job Est. | | | | | |
| Fish Stream Improvement | Job Est. | | | | | |
| Fishpond Management | Per Pond | | | | | |
| Floodwater Diversion @ /cu yd | 1,000 ft | | | | | |
| Floodway | | | | | | |
| Class I | 1,000 cu yd | | | | | |
| Class II | 1,000 cu yd | | | | | |
| Class III | 1,000 cu yd | | | | | |

| Conservation Practice | Indicator Unit | Flat Rate Install. Cost $ | Life-span YRS. | Annual O&M Costs % | Total Annual Costs $ | Local Total Annual Costs $ |
|---|---|---|---|---|---|---|
| Grade Stabilization Structure | Job Est. | | | | | |
| Grassed Waterway or Outlet | Acre | | | | | |
| Grasses and Legumes in Rotation | Acre | - Considered as a production cost for crops. | | | | |
| Grazing Land (Mechanical Treatment) | | | | | | |
| Contour Furrowing | Acre | | | | | |
| Pitting | Acre | | | | | |
| Chiseling | Acre | | | | | |
| Heavy Use Area Protection | | | | | | |
| Vegetative Cover | - See Critical Area Planting. | | | | | |
| Gravel | 100 sq ft | | | | | |
| Blacktop | 100 sq ft | | | | | |
| Paving | 100 sq ft | | | | | |
| Hedgerow Planting | 1,000 ft | | | | | |
| Irrigation Canal or Lateral | Job Est. | | | | | |
| Irrigation Field Ditch | 1,000 ft | | | | | |

| Conservation Practice | Indicator Unit | Flat Rate Install. Cost $ | Life-span YRS. | Annual O&M Costs % | Total Annual Costs $ | Local Total Annual Costs $ |
|---|---|---|---|---|---|---|
| Irrigation Land Leveling | | | | | | |
| Regular | Acre | | | | | |
| Bench | 1,000 cu yd | | | | | |
| Contour with terraces | Acre | | | | | |
| Irrigation Pit or Regulating Reservoir | Job Est. | | | | | |
| Irrigation Storage Reservoir | Job Est. | | | | | |
| Irrigation System - Drip For windbreak establishment | 1,000 trees | | | | | |
| Irrigation System - Sprinkler (Complete with well, pump and power unit) | | | | | | |
| Skid-tow (140 acres irrigated) | 140 Ac | | | | | |
| Traveling Gun (100 acres irrigated) | 100 Ac | | | | | |
| Center Pivot (130 acres irrigated) | 130 Ac | | | | | |
| Center Pivot with corner attachment (150 acres irrigated) | 150 Ac | | | | | |

| Conservation Practice | Indicator Unit | Flat Rate Install. Cost $ | Life-span YRS. | Annual O&M Costs % | Total Annual Costs $ | Local Total Annual Costs $ |
|---|---|---|---|---|---|---|
| Irrigation System - Surface (Gated pipe with tail-water recovery, well and pumps) | Ac | | | | | |
| Irrigation System | | | | | | |
| Tailwater Recovery | Job Est. | | | | | |
| Irrigation Water Management | -Included as a production cost in irrigation crops | | | | | |
| Irrigation Water Conveyance | | | | | | |
| Nonreinforced concrete | cu yd concrete | | | | | |
| Flexible membrane | 1,000 sq ft | | | | | |
| Irrigation Pipeline (Less than 22 psi operating pressure) | | | | | | |
| 4" diameter | 100 ft | | | | | |
| 6" diameter | 100 ft | | | | | |
| 8" diameter | 100 ft | | | | | |
| 10" diameter | 100 ft | | | | | |
| 12" diameter | 100 ft | | | | | |
| Irrigation Pipeline (22 psi - 80 psi or greater operating pressure) | | | | | | |
| 4" diameter | 100 ft | | | | | |
| 6" diameter | 100 ft | | | | | |
| 8" diameter | 100 ft | | | | | |
| 10" diameter | 100 ft | | | | | |
| 12" diameter | 100 ft | | | | | |

| Conservation Practice | Indicator Unit | Flat Rate Install. Cost $ | Lifespan YRS | Annual O&M Costs % | Total Annual Costs $ | Local Total Annual Costs $ |
|---|---|---|---|---|---|---|
| Land Clearing | Acre | | | | | |
| Land Smoothing | Acre | | | | | |
| Lined Waterway or Outlet | cu yd concrete | | | | | |
| | 100 sq ft concrete block | | | | | |
| Livestock Exclusion | See Fencing | | | | | |
| Minimum Tillage | Acre - No additional cost over conventional tillage. Tillage costs included as crop production costs. | | | | | |
| Mulching (Anchored by) | | | | | | |
| Treading | Acre | | | | | |
| Netting | 100 sq yd | | | | | |
| Asphalt Emulsion | Acre | | | | | |
| Obstruction Removal | cu yd | | | | | |
| Open Channel | 1,000 cu yd | | | | | |
| Pasture and Hayland Management | | | | | | |
| Pasture | | | | | | |
| Continuous grazing | Acre | | | | | |
| Rotation grazing (High level management) | Acre - Additional fences and water supplies not included. | | | | | |
| Hayland | | | | | | |
| Low level management | Acre | | | | | |
| High level management | Acre | | | | | |

| Conservation Practice | Indicator Unit | Flat Rate Install. Cost $ | Lifespan YRS | Annual O&M Costs % | Total Annual Costs $ | Local Total Annual Costs $ |
|---|---|---|---|---|---|---|
| **Pasture and Hayland Planting** | | | | | | |
| Tame species seeded with companion crop | Acre | | | | | |
| Tame species with seedbed preparation | Acre | | | | | |
| Native species with seedbed preparation | Acre | | | | | |
| **Pipeline - Plastic** | | | | | | |
| 1" - 1 1/4" diameter | 1,000 ft | | | | | |
| 1 1/2" - 1" diameter | 1,000 ft | | | | | |
| 2 1/2" - diameter | 1,000 ft | | | | | |
| Planned Grazing System | Acre - Other installation costs are included in other conservation practices. | | | | | |
| **Pond** | | | | | | |
| Embankment with Pipe | 1,000 cu yd | | | | | |
| Embankment without pipe | 1,000 cu yd | | | | | |
| Excavated | 1,000 cu yd | | | | | |

| Conservation Practice | Indicator Unit | Flat Rate Install. Cost $ | Life-span YRS. | Annual O&M Costs % | Total Annual Costs $ | Local Total Annual Costs $ |
|---|---|---|---|---|---|---|
| Pond Sealing or Lining | | | | | | |
| Polyethylene or PVC - 8 mil | 1,000 sq ft | | | | | |
| Bentonite at 2# per sq ft | 1,000 sq ft | | | | | |
| Soil Disperant | 1,000 sq ft | | | | | |
| Soda Ash | 1,000 sq ft | | | | | |
| Prescribed Burning (320 acres) | 1/2 Section | | | | | |
| Proper Grazing Use | Acre | | | | | |
| Pumped Well Drain | Job Est. | | | | | |
| Pumping Plant for Water Control | Job Est. | | | | | |
| Range Seeding | Acre | | | | | |
| Reclamation of Surface Mined Land | | | | | | |
| Land Reconstruction (Abandoned mines) | Acre | | | | | |
| Land Reconstruction (New Mines) | Acre | | | | | |
| Prime farmland | Acre | | | | | |
| Nonprime | Acre | | | | | |

| Conservation Practice | Indicator Unit | Flat Rate Install. Cost $ | Lifespan Yrs | Annual O&M Costs % | Total Annual Costs $ | Local Total Annual Costs $ |
|---|---|---|---|---|---|---|
| Recreation Area Improvement | Area | - See individual practices used for the improvement. | | | | |
| Recreation Land Grading and Shaping | | | | | | |
| Grading | 1,000 cu yd | | | | | |
| Shaping | Acre | | | | | |
| Recreation Trail and Walkway | | | | | | |
| Packed Earth | 1,000 ft | | | | | |
| Gravel | 1,000 ft | | | | | |
| Asphalt | 1,000 ft | | | | | |
| Paved | 1,000 ft | | | | | |
| Regulating Water in Drainage Systems | - See individual practices used to install system. | | | | | |
| Spoilbank Spreading | | | | | | |
| At time of excavation | 1,000 cu yd | | | | | |
| Old spoilbanks | 1,000 cu yd | | | | | |
| Spring Development | Job Est. | | | | | |

| Conservation Practice | Indicator Unit | Flat Rate Install. Cost $ | Lifespan YRS. | Annual O&M Costs % | Total Annual Costs $ | Local Total Annual Costs $ |
|---|---|---|---|---|---|---|
| Streambank Protection - See individual practices needed to protect streambank. | | | | | | |
| Stream Channel Stabilization - See individual practices needed to stabilize channel. | | | | | | |
| Stripcropping | | | | | | |
| Contour | Acre | | | | | |
| Field | Acre | | | | | |
| Wind - 10 rod strips | Acre | | | | | |
| 11-20 rod strips | | | | | | |
| 21-30 rod strips | | | | | | |
| Structure for Water Control | Job Est. | | | | | |
| Stubble Mulching (Establishment only) | Acre | | | | | |
| Subsurface Drain | | | | | | |
| 4" tile | 1,000 ft | | | | | |
| 5" tile | 1,000 ft | | | | | |
| 6" tile | 1,000 ft | | | | | |
| 8" tile | 1,000 ft | | | | | |
| 10" tile | 1,000 ft | | | | | |
| 12" tile | 1,000 ft | | | | | |

| Conservation Practice | Indicator Unit | Flat Rate Install. Cost $ | Lifespan YRS. | Annual O&M Costs % | Total Annual Costs $ | Local Total Annual Costs $ |
|---|---|---|---|---|---|---|
| Surface Drainage | | | | | | |
| Field Ditch | 1,000 ft | | | | | |
| Main or lateral | 1,000 cu yd | | | | | |
| Terrace, Gradient | - Terrace outlet not included. See Grassed Waterway or Outlet or Subsurface Drain. | | | | | |
| Regular types | 1,000 ft | | | | | |
| Grassed back slope | 1,000 ft | | | | | |
| Terrace, Gradient | | | | | | |
| Parallel | 1,000 ft | | | | | |
| Tile Outlet | | | | | | |
| 8-12% slopes | Acre | | | | | |
| 12-16% slopes | Acre | | | | | |
| Terrace, Level | | | | | | |
| Regular types | 1,000 ft | | | | | |
| Flat channel | 1,000 ft | | | | | |
| Flat channel - Parallel | 1,000 ft | | | | | |
| Toxic Salt Reduction | Job Est. | | | | | |

| Conservation Practice | Indicator Unit | Flat Rate Install. Cost $ | Life-Span YRS | Annual O&M Costs % | Total Annual Costs $ | Local Total Annual Costs $ |
|---|---|---|---|---|---|---|
| Tree Planting (Hand) | | | | | | |
| Hardwoods | 1,000 trees | | | | | |
| Conifers | 1,000 trees | | | | | |
| Trough or Tank | 1,000 gal | | | | | |
| Waste Management System | - See individual practices used in the system. | | | | | |
| Waste Storage Pond | - See Ponds | | | | | |
| Waste Storage Structure | | | | | | |
| Holding tanks - concrete | 1,000 cu ft | | | | | |
| Manure stacking facilities | 1,000 cu ft | | | | | |
| Waste Treatment Lagoon | - See Ponds | | | | | |
| Waste Utilization | - Rate not established | | | | | |
| Waterspreading | - See individual practices planned for the waterspreading system. | | | | | |
| Well | | | | | | |
| Livestock (4" diameter casing) | 100 ft | | | | | |
| Irrigation (6-10" diameter casing) | 100 ft | | | | | |

| Conservation Practice | Indicator Unit | Flat Rate Install. Cost $ | Life-Span YRS | Annual O&M Costs % | Total Annual Costs $ | Local Total Annual Costs $ |
|---|---|---|---|---|---|---|
| Wildlife Upland Habitat Management | | | | | | |
| Preservation Only | Acre | | | | | |
| Improvement | - See individual practices and crop production schedules for cost of items being considered for improving habitat. | | | | | |
| Wildlife Watering Facility | - See Ponds | | | | | |
| Wildlife Wetland Habitat Management | | | | | | |
| Preservation Only | Acre | | | | | |
| Improvement | - See individual practices and crop production schedules for cost of items being considered for improving habitat. | | | | | |
| Level Ditches | 1,000 cu yd | | | | | |
| Windbreak Renovation | Acre (Includes removal of existing trees and replanting.) | | | | | |
| Woodland Direct Seeding | Acre | | | | | |
| Cyclone Seeding | | | | | | |
| Tractor Mounted | Acre | | | | | |
| Hand Held | Acre | | | | | |
| Aircraft | | | | | | |
| Fixed Wing | Acre | | | | | |
| Helicopter | Acre | | | | | |
| Woodland Improved Harvesting | Acre (Occurs only during intermediate or final harvest year. Annual cost not comparable.) | | | | | |
| Woodland Improvement (50 yr rotation cycle) | | | | | | |
| 1st | Acre | | | | | |
| 2nd | Acre | | | | | |
| 3rd | Acre | | | | | |

| Conservation Practice | Indicator Unit | Flat Rate Install. Cost $ | Lifespan YRS | Annual O&M Costs % | Total Annual Costs $ | Local Total Annual Costs $ |
|---|---|---|---|---|---|---|
| Woodland Pruning (50 yr rotation) | | | | | | |
| Black walnut | Acre | | | | | |
| Red and White Pine | Acre | | | | | |
| Woodland Site Preparation | | | | | | |
| Mechanical | Acre | | | | | |
| Herbicide | Acre | | | | | |
| Bruning | Acre | | | | | |