

U.C. COOPERATIVE EXTENSION
SAMPLE COST TO ESTABLISH AND PRODUCE

COTTON



IMPERIAL COUNTY – 2004

Prepared by:

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For an explanation of calculations used for the study refer to the attached General Assumptions or call the author, Herman Meister, at the Imperial County Cooperative Extension office, (760)352-9474 or e-mail at hmeister@ucdavis.edu.

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FOREWORD

We wish to thank growers, pest control advisors, chemical applicators and chemical dealers, custom farm operators, fertilizer dealers, seed companies, contract harvesters, equipment companies, and the Imperial County Agricultural Commissioner's office for providing us with the data necessary to compile this circular. Without their cooperation we could not have achieved the accuracy needed for evaluating the cost of production for the field crop industry in Imperial County.

The information presented herein allows one to get a "ballpark" idea of field crop production costs and practices in the Imperial County. Most of the information was collected through verbal communications via office visits and personal phone calls. The information does not reflect the exact values or practices of any one grower, but are rather an average of countywide prevailing costs and practices. Exact costs incurred by individual growers depend upon many variables such as weather, land rent, seed, choice of agrichemicals, location, time of planting, etc. No exact comparison with individual grower practice is possible or intended. The budgets do reflect, however, the prevailing industry trends within the region.

Overhead usually includes secretarial and office expenses, general farm supplies, communications, utilities, farm shop, transportation, moving farm equipment, accountants, insurance, safety training, permits, etc. Eleven to 13% of the total of land preparation, growing costs and land rent was used to estimate overhead. Hourly rates vary with each crop depending on the workman's compensation percentages.

Since all of the inputs used to figure production costs are impossible to document in a single page, we have included extra expense in man-hours or overhead to account for such items as pipe setting, motor grader, water truck, shovel work, bird and rodent control, etc. Whenever possible we have given the costs of these operations per hour listed on the cultural operations page. Some custom operators have indicated that they are instituting a "fuel surcharge" to reflect "spikes" in fuel cost.

Not included in these production costs are expenses resulting from management fees, loans, providing supervision, or return on investments. The crop budgets also do not contain expenses encumbered for road and ditch maintenance, and perimeter weed control. If all the above items were taken into account, the budget may need to be increased by 7-15%.

Where applicable we have used terminology that is commonly used in the agricultural industry. These terms are compiled in a glossary at the end of the circular. We feel that an understanding of these terms will be useful to entry-level growers, bankers, students and visitors.

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**2004-2005 Tillage & Harvest Rates
IMPERIAL COUNTY**

**HEAVY TRACTOR WORK & LAND
PREPARATION**

<u>OPERATION</u>	<u>\$/ACRE</u>
Plow.....	32.00
Subsoil 2 nd gear.....	45.00
Subsoil 3 rd gear.....	38.00
Landplane.....	14.00
Triplane.....	12.00
Chisel 15".....	26.00
Wil-Rich chisel.....	17.00
Big Ox.....	25.00
Slip plow.....	43.00
Mark/disc borders.....	10.50
Make cross checks (taps).....	6.75
Break border.....	6.50
Stubble disc/with cultipack.....	22.50/24.50
Regular disc/with cultipack.....	13.00/15.00
List 30"-12 row/40" 8 row.....	16.50
Float.....	11.50
Dump (scraper) borders.....	18.25
Corrugate.....	14.00

LIGHT TRACTOR WORK

Power mulch dry.....	27.50
Power mulch with herbicide.....	31.00
Shape 30" 6-row / 40" 4-row.....	12.75/12.75
Plant sugar beets & cotton 30"/40".....	17.00/15.00
Plant vegetables.....	20.00
Mulch plant wheat.....	20.25
Plant alfalfa (corrugated).....	18.50
Plant alfalfa (beds).....	19.00
Plant bermudagrass.....	13.75
Plant with drill (sudangrass, wheat).....	14.75
Plant corn slope.....	17.00
Cultivate 30"/40" beds 4-row.....	16.00/14.00
Spike 30"/40" beds 4-row.....	13.00/11.00
Spike and furrow out 30"/40" 4-row.....	14.00/12.00
Furrow out 30"/40" beds 4-row.....	13.00/11.00
Lilliston 30" 6-row / 40" 4-row.....	14.00/14.00
Lilliston 30" 6 row / 40" 4-row/ herb.....	15.50/15.50
Inj fert & fur out 30"/ 40" beds 4-row.....	16.50/14.50
Fertilize dry & fur out 30"/ 40" 4-row.....	17.00/15.00
Inject fertilizer flat.....	15.00
Broadcast dry fertilizer.....	8.00
Ground spray 30"/40" 8-row.....	12.00
Chop cotton stalks 30"/40"beds.....	16.00/14.00
List 80" melon beds.....	20.00
Plant 80" melon slope beds.....	22.00

Back fill furrow (melons).....9.5

Cultivate 80" melon slope beds.....	18.00
Center 80" melon beds.....	17.00
Re-run 80" melon beds.....	11.00
Inject fertilizer & furrow out 80" melon beds.....	18.00
Bust out 80" melon beds.....	12.00

HARVEST COSTS-FIELD CROPS

BY UNIT

Windrow alfalfa seed.....	17.50/acre
Combine alfalfa seed.....	41.00/acre
Swath bermudagrass.....	13.75/acre
Rake bermudagrass.....	5.50/acre
Swath sudangrass.....	11.25/acre
Rake sudangrass.....	6.00/acre
Swath alfalfa.....	8.75/acre
Rake alfalfa.....	5.00/acre
Bale (all types of hay- small bale).....	0.70/bale
Haul & stack hay – small bale.....	0.27/bale
Bale (large bale 4X4).....	7.50/bale
Haul & stack big bale.....	3.50/bale
Load with hay squeeze.....	62.50 / load
Dig sugar beets.....	2.65/clean ton
Haul sugar beets.....	2.50/clean ton
Combine wheat16.00 per acre + 0.60 /cwt. over 1 ton	
Haul wheat.....	5.00/ton
Combine bermudagrass seed 1st time.....	42.50/acre
Combine bermudagrass seed 2nd time.....	26.50/acre
Haul bermudagrass seed (local).....	175/load
Pick Cotton 1 st /2 nd03cts/lb/35.00/acre

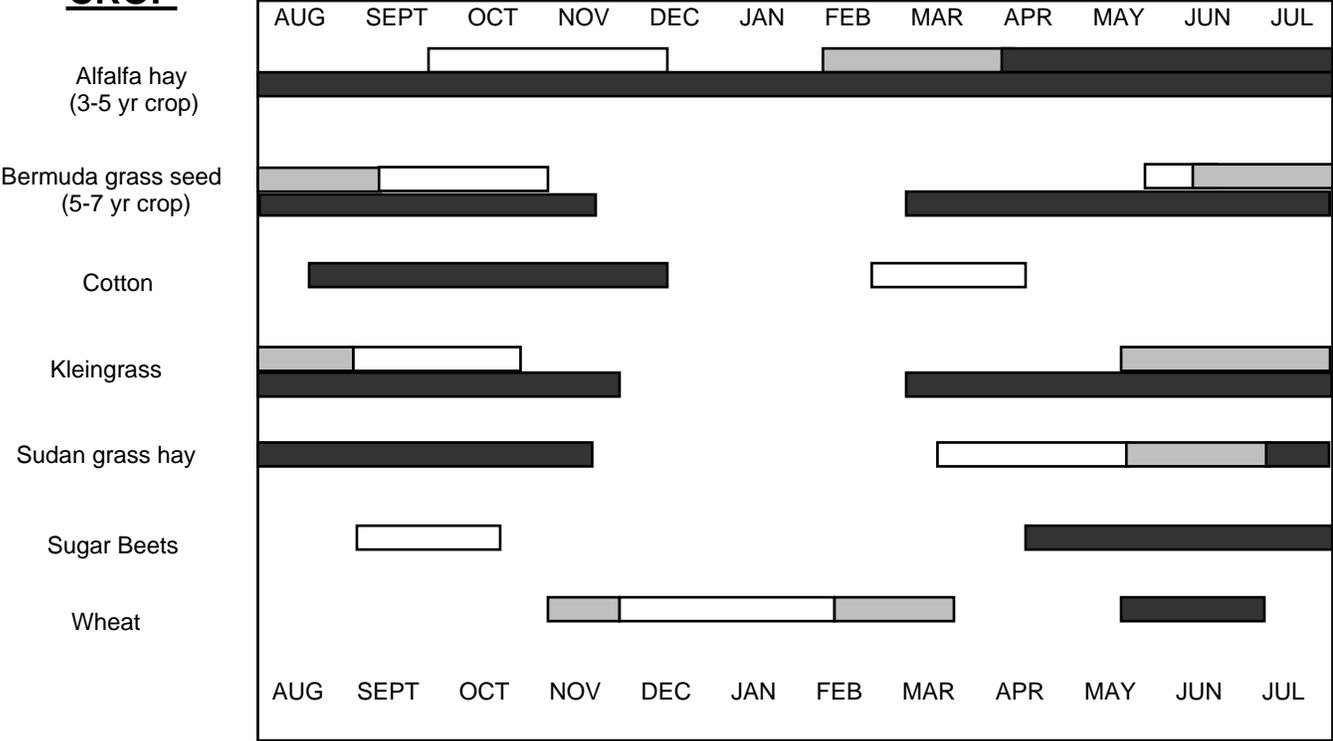
MISCELLANEOUS RATES BY THE HOUR

\$/HR

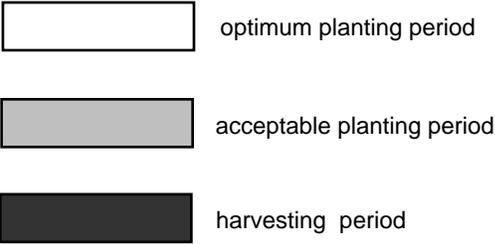
Motor grader.....	55.00
Backhoe.....	50.00
Water truck.....	40.00
Wheel tractor.....	35.00
Scraper.....	36.00
Versatile.....	60.00
D-6.....	56.00
D-8.....	73.00
Buck ends of field.....	35.00
Pipe setting (2 men).....	38.00
Laser level.....	90.00
Work ends (disc out rotobucks).....	40.00

FIELD CROPS PLANTING & HARVESTING CALENDAR IMPERIAL VALLEY, CALIFORNIA

CROP

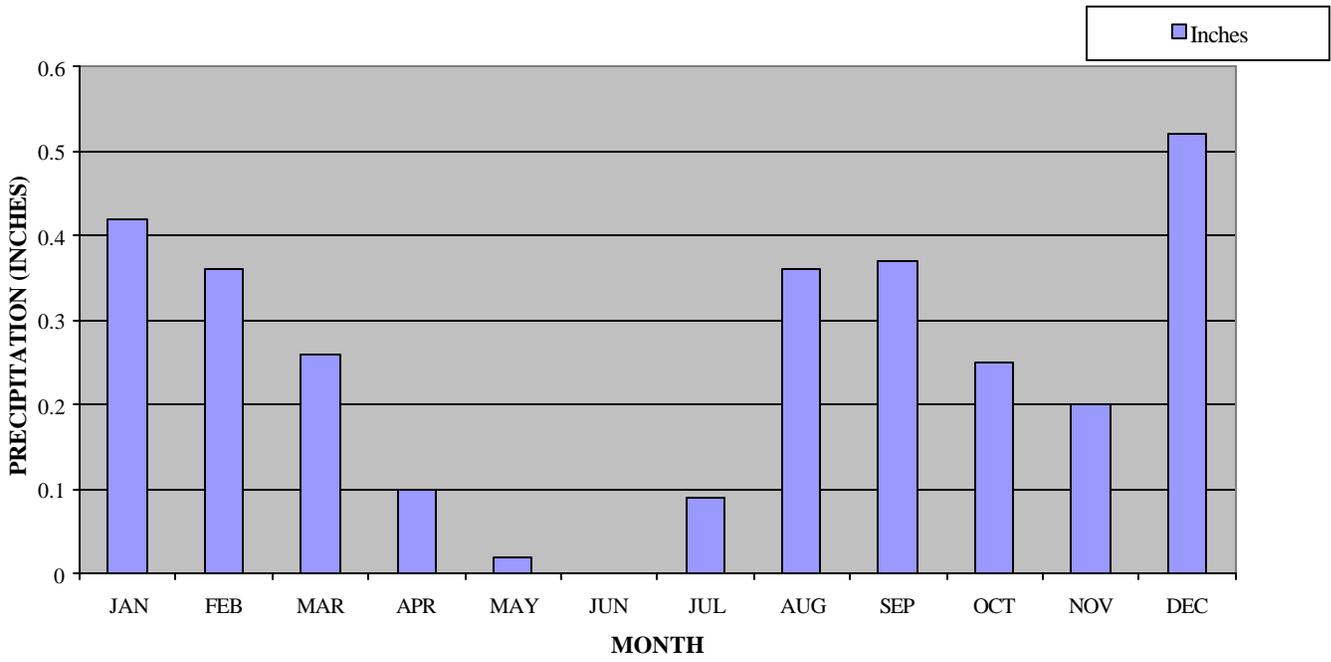
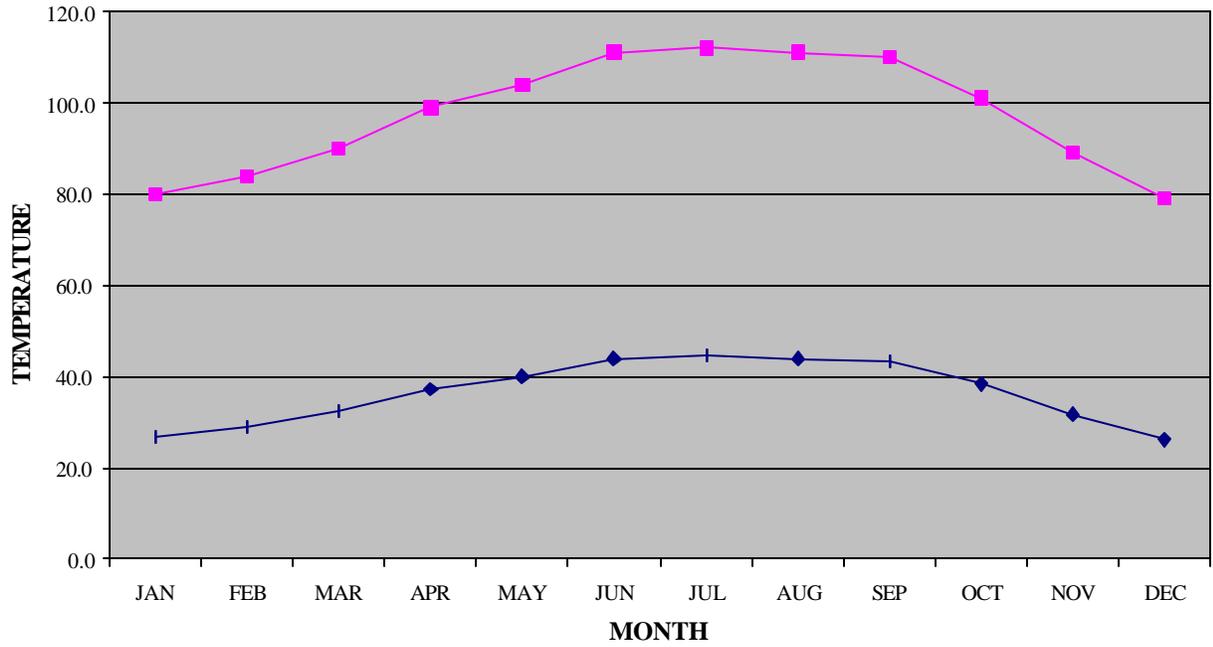
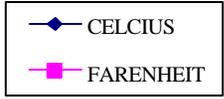


MONTH



IMPERIAL COUNTY WEATHER

Imperial Irrigation District
81 year average (1914-1994)



IMPERIAL COUNTY COTTON PRODUCTION COSTS 2004-2005

80 Acre Field

Mechanical operations at prevailing rates. Labor at \$8.70/hr (\$6.75 plus SS, unemployment, workman's compensation and fringe benefits).

Yield- 1500 pounds lint per acre (3.0 bales @ 500 lb/bale). Days to harvest 170 to 200+ days.

OPERATION	Prevailing Rate	MATERIALS		HAND LABOR		COST Per Acre
		Type /Amount	Cost	Hours	Dollars	
LAND PREPARATION						
Stubble disc/ring roller	24.50					24.50
Big Ox	25.00					25.00
Disc	13.00					13.00
Triplane	12.00					12.00
Broadcast fertilizer	8.00	200 lb 11-52-0	30.00			38.00
List and inject fertilizer	18.00	100 lb. N anhydrous	22.00			40.00
Irrigate beds		0.5 ac-ft	8.00	1	8.70	16.70
Lilliston	14.00					14.00
TOTAL LAND PREPARATION COSTS						183.20
GROWING PERIOD						
Seed technology fee	41.00	RR & Bt				41.00
Plant - Shape/insecticide	17.00	Insecticide	20.00			37.00
Preemergence weed control	12.50	Herbicide	3.50			16.00
Cultivate and sidedress	15.00	100 lb N UAN32	38.00			53.00
Layby herbicide	15.50	Herbicide	15.50			31.00
Irrigate 12x		Water 4.5 ac-ft	72.00	4	34.80	106.80
Water-run fertilizer		60 lb N anyhdrous	13.20			13.20
Insects 5X (air-night-10gpa)*	12.00	Insecticide	200.00			260.00
Defoliate 1x	12.00	Defoliant	15.00			27.00
Work ends	5.00					5.00
Chop stalks	16.00					16.00
TOTAL GROWING PERIOD COSTS						606.00
GROWING PERIOD & LAND PREPARATION COSTS						789.20
Land rent (net acres)						155.00
Cash overhead--		13 % growing period, land prep and land rent				122.75
TOTAL PREHARVEST COSTS						1,066.95
HARVEST COSTS & BALE ASSESSMENTS						
Machine picking & hauling	3.00 /bales	@ 33% clean lint				157.50
Ginning & planting seed		NC (price offset by seed value)				0.00
Bale assessments	3.80 /bale	3 bales				11.40
TOTAL HARVEST COSTS & BALE ASSESSMENTS						168.90
TOTAL ALL COSTS						1,235.85

* Insect control will vary depending on the level of infestation for the year

Yield lb. lint/ac	PROJECTED NET GAIN (PER ACRE)					Breakeven \$/lb.
	price/lb lint (cents)					
	0.70	0.75	0.80	0.85	0.9	
1000	-480	-430	-380	-330	-280	1.18
1250	-333	-270	-208	-145	-83	0.97
1500	-186	-111	-36	39	114	0.82
1750	-39	49	136	224	311	0.72
2000	108	208	308	408	508	0.65



IMPERIAL COUNTY COTTON CULTURE 2004-2005

Annual acreage, yields, and value of cotton lint in
Imperial County, CA for five consecutive years

Year	Acres	Yield/Acre (bales)*	Value/Acre
2003	6,215	3.02	\$1158
2002	10,643	2.59	\$1030
2001	16,528	2.83	\$1019
2000	9,295	3.09	\$1039
1999	10,028	2.88	\$959

* 500 lb. Bales (Source: Imperial County Agricultural Commissioner's Reports).

LAND PREPARATION: Cotton can be grown flat between borders, but is more commonly grown on 30 or 40-inch raised beds. The soil is usually pre-irrigated to obtain bottom moisture and germinate weeds. The beds are cultivated with a lilliston, planted, and irrigated. Cotton can be dry-planted and irrigated up later in the season when soil temperature conditions are more favorable for germination.

PLANTING DATES AND RATES: Cotton yields are normally higher when the crop is planted in early to mid-March. Yields start to decrease when cotton is planted after April 15th. A soil temperature of at least 62°F at a 6-inch depth is desirable for successful germination. Spacing within the row of 3 to 4 inches is desirable.

VARIETIES: Currently DP 449BR has become the standard variety for the area. It is a “stacked” transgenic variety with both the Bt toxin for pink bollworm control and the gene to tolerate Roundup herbicide for over-the-top applications up until certain stages of growth. Some "DP 5415 RR" and other non-Bollgard varieties are being grown to meet the USDA requirements for refuge to prevent insect resistance from developing. Some other varieties planted include DP555BR and DP 444BR.

FERTILIZATION: Cotton yields are highest when ample nutrients are applied early in the season. Two hundred fifty pounds of nitrogen per acre is usually necessary to produce a good crop. The nitrogen applications should be made before planting in the pre-irrigated beds and an additional application as a sidedress before 1st bloom with a water run if necessary depending on petiole sample results. The total nitrogen and phosphate required to produce a crop depends on carryover from the previous crop. Soil samples along with a petiole analysis program are suggested to be used as management tools for evaluating the need for nitrogen and phosphorus fertilizer. Pix is a plant growth regulator compound that has been used to assist in controlling the vegetative growth of cotton in certain instances.

IRRIGATION: After the germination irrigation, the next irrigation is usually necessary about 1st square or around 60 days after the germination water. If the crop requires irrigation before 1st square, apply a quick irrigation to avoid saturating the soil. The next irrigation after 1st square will be approximately 2-3



weeks later. During the time before the second irrigation, the crop will be cultivated, sidedressed, and the layby herbicide applied. The irrigation frequency for the remainder of the season will depend on the plant growth, boll load, and the weather.

WEED CONTROL: Weeds in cotton can reduce yield, interfere with harvest and reduce lint quality. Pre-emergence, post-emergence, and layby herbicide applications are used on most cotton fields. Consult your pest control advisor or Weed Science Farm Advisor for current recommendations.

PEST CONTROL: The silverleaf whitefly and lygus are the most serious threats to cotton production currently. Other pests such as pink bollworm, cotton leaf perforator, tobacco budworm and cotton bollworm have been reduced to low levels with the Bollgard cotton varieties. Leafhoppers and spider mites may require treatment occasionally. The presence of these pests may result in increased costs for pest control since multiple applications may be necessary to keep them in check. The estimated insecticide costs could be higher or lower depending upon the levels of infestation and required control measures. Consult your pest control advisor for most recent information and control recommendations.

Seedling disease complex can reduce cotton stands to the point where replanting may be necessary. The most common organisms involved are the following fungi: *Pythium ultimum*, *Rhizoctonia solani*, and *Thielaviopsis basicola*. Seedling disease problems frequently are more severe where cotton follows sugar beets or alfalfa. Cool soil temperatures and deep seed placement increases disease severity. Fungicide seed treatments should be used to control seedling diseases. Root knot nematode (*Meloidogyne* spp.) is a serious pest when acting alone, but will also function as a primary organism in several disease complexes involving fungi.

HARVESTING: Cotton is harvested from early October through December. Fields are harvested only once, as multiple picking has not proven to be economical in recent times due to the use of high efficiency pickers. Consequently, cotton scrapping is not practiced unless there is a summer rainstorm and/or heavy winds cause cotton to be stripped from the plants.

Defoliation is usually applied about 3-4 weeks after the last irrigation. Defoliation should be complete and few, if any, green leaves should be left on the plants as they can stain the lint. Bolls should be completely open and dried. A pre-conditioning chemical may be used prior to defoliation to enhance boll opening.

Ginning costs, module compressing, and module transport and are currently offset by the value of the cottonseed.



GLOSSARY

- 10% Bloom** stage of growth in alfalfa when 10% of the stems are flowering.
- Bale or Baling** Compacting dried alfalfa or grass into a compact package usually weighing 100-120 lbs.
- Bed** Mounded soil that is shaped and used for planting; beds are separated by furrows.
- Berry** see *kernel*
- Big Ox®** A chisel with 7 shanks used to rip soil 18-24 inches deep.
- Blacken the beds** To thoroughly wet/darken a bed with irrigation water applied in furrows.
- Black point** Darkened, sometimes shriveled embryo end of wheat seed; caused by several fungi including *Alternaria*, *Fusarium*, and *Helminthosporium*; also called kernel smudge.
- Bleach** Loss of green color in hay due to sun exposure.
- Boot stage** Stage of wheat development when the sheath surrounding the inflorescence expands.
- Break borders** To tear down flat flood borders or flat crop borders.
- Broadcast** To spread seed on the soil surface.
- Buck ends of field** The remaking of beds at the end of a field in order to channel when beds at the end of a field are destroyed due to insufficient turn around space for farm equipment.
- Chisel** A tractor-mounted, knifelike implement used to rip soil 15-20 inches deep.
- Corrugation** Ridges made in soil to control the flow of water down a field (mini-beds). Name stems from the resemblance to corrugated sheet metal.
- Crimping** Mechanical operation used to crush stems of hay for better curing.
- Cross checks** Small dikes at perpendicular angles to borders used for water diversion into a field; also called taps.
- Cultipacker** A farm implement used to break up clods of soil; consists of groups of knobbed metal rings stacked together; also called a ringroller.
- Cultivate** To work beds after planting in order to control weeds, loosen soil, and allow for application of fertilizer
- Custom rate** The value assigned to a cultural operation by farmers or contractors for cost accounting; normally includes the cost of the operator.
- Cwt of CWT** One hundred pounds
- Damping-off** A fungal disease of seedlings
- Dough stage** Stage of wheat kernel development, when kernels are mature, but not hardened.
- Dormant varieties** Alfalfa varieties which do not produce much growth in cold weather.
- Drill** Type of planter used for cereals.
- Dump borders** See *scraper borders*
- Eagle beak** Type of planter shoe shaped like an eagle's beak used in mulch planting crops such as wheat.
- Float** A large, wooden frame pulled with a tractor for rough leveling of the soil surface.
- Flood irrigation** A method of irrigation where water is applied a field by gravity; the water is channeled by earth borders that are usually 70-200 feet apart.
- Full bloom** Alfalfa blooming at maximum potential.
- Furrow irrigation** A method of irrigation where water is applied to fields by gravity flow, down furrows; the water enters the bed by capillary action.
- Furrow out** The movement of soil from furrows to beds by tractor-mounted shovels; removes impediments to irrigation water.
- Grated pipe** Large diameter pipes used to deliver low pressure water to each furrow; used to keep head end of field dry for cultivation or harvesting.
- Green chop** Alfalfa that is cut green and dehydrated for making alfalfa pellets.
- Ground spray** The application of an agrichemical by a tractor-mounted sprayer.
- Inject fertilizer** The application of liquid or liquid fertilizer in the top or sides of a bed.
- Irrigate up** To irrigate a crop to emergence.
- Kernel smudge** See *black point*.
- Landplane** A large, tractor-pulled land leveling machine.
- Laser level** A land surface leveler that uses a laser guiding device to maintain an accurate grade.
- Layby** To apply an herbicide or other agrichemical at the last opportunity to enter a field with a tractor prior to harvest.
- Lilliston** A rolling cultivator with curved tines which uses ground speed to assist in working up the soil surface in order to destroy weeds.
- Listing** Throwing soil into a mound to make beds.
- Lodge** Cereals falling over due to the weight of the seed and lack of stem strength.
- Motor grader** A large grader normally used to cut tail ditches for draining off excess surface water.

- Mulch plant** Planting seed into moist soil; no additional irrigation needed to germinate crop.
- Noncruciferous** Any crop other than members of the cabbage family (e.g., broccoli, brussels sprouts, cauliflower, etc.)
- Nondeterminant** Describes a plant's growth habit; plant size is not determined and may increase (within limits) as long as proper growth conditions exist.
- Off types** Plant types whose characteristics differ from those of the true variety.
- Pipe setting** Installing 2-inch plastic tubes through a soil berm with a hydraulic ram; the pipes are used to control the flow of irrigation water.
- Pinch wheel** Type of sugar beet harvester which grasps the beet leaves by pinching.
- Planting to stand** Planting the same number of seeds as the desired number of plants in a field.
- Plow** To mix soil by inversion.
- Power mulch** A tractor-mounted, power rototiller.
- Pull borders** To make flood berms used to channel the flow of surface applied water.
- Punching pipe** see *pipe setting*.
- Raking** Rolling hay to a windrow in order to dry, or combining windrows.
- Random flow planter** A non-precision planter; seed drop is regulated by agitating the seed in a hopper over a hole; planting rate depends upon hole size and tractor speed.
- Rank growth** Excessive growth.
- Roll beds** To roll a large, metal roller over the tops of beds in order to firm them prior to thinning.
- Rototill** To mechanically mix soil.
- Row** A line of plants or a bed with a single line of plants.
- Scald** Death of plants due to excessive soil moisture during period of high temperature causing lack of oxygen to the plant roots; e.g., alfalfa, bermuda grass, and sudan grass.
- Scraper borders** Method of making borders without leaving low spots in soil within the area to be planted; helps to prevent water puddling thus preventing scald and root diseases.
- Seed line** A line down a bed in which seeds are planted.
- Semolina flour** Flour made from Durum wheat and used to make pasta.
- Shatter** Loss of grain from the seed heads prior to harvest, often caused by wind or moisture.
- Sidedress** To place pesticides or fertilizers in a band next to a row of plants.
- Slip plow** An implement pulled by a caterpillar and used to make deep cuts into the soil whereby soil from below is carried upward into the cut; used to improve drainage.
- Solitary bees** Type of bee used for pollination which lives alone, not in colonies.
- Spike** The running of tractor-mounted shanks into the soil or beds to improve aeration and drainage.
- Spike wheel** Type of sugar beet harvester using long metal spikes to penetrate the beets and hold them while lifting them out of the ground.
- Stand** The density of plants in a field after emergence.
- Stubble disc** An implement used to chop crop residue and incorporate it into the soil; the blades are scalloped unlike a standard disc..
- Subbing** Irrigation method where water is applied to a field in furrows and allowed to travel across beds by capillary action.
- Subsoil** The pulling of large, hard-faced shanks through the soil up to 42 inches deep; used to shatter soil layers and improve drainage, and leach salts.
- Top crop** Cotton bolls set at the top of the plant; the late crop.
- Triplane** A smaller, three-wheeled version of a *landplane*.
- Versatile** A large 4-wheel drive tractor used to pull discs and other implements.
- Water back** Irrigate again, often after sprinkling.
- Water fun** An application of an agrichemical in irrigation water (i.e., furrow irrigation).
- Wil-rich chisel plow** An implement used to work wet or moist soils prior to making beds.
- Windrow** Forage cut from the plants and raked into a single line for curing and baling.
- Work ends** Miscellaneous field operations including use of a motor grader to cut a tail ditch for irrigation drain water; or bucking ends and pipe punching.
- Yellowberry** wheat kernels that are yellow rather than the normal opaque; usually the result of insufficient, nitrogen fertilization.