

Seasonal Tunnel System for Crops

Interim Conservation Practice Job Sheet 798



Definition

Seasonal Tunnel Systems for Crops are seasonal polyethylene covered structures used to cover crops to extend the growing season in an environmentally friendly manner. Seasonal Tunnel Systems are not heated and depend on the plastic covering to modify internal climate to the advantage of the plants growing inside.

Purpose

Seasonal Tunnel Systems for Crops are used to extend the crop growing season, improve plant quality, improve soil quality and improve water quality from reduced nutrient and pesticide

transport. The growing season can be extended by 2-4 weeks by protecting crops from potentially damaging weather conditions. Due to the microclimate inside the tunnel crops tend to be of higher quality and produce higher yields than field-grown crops by increasing the temperature surrounding the crop and minimizing the heat loss during the nighttime. Soil quality is improved by the use of increased management techniques in the tunnel, the addition of compost or organic matter and a decrease in the potential for soil erosion. As plants inside the tunnel tend to experience less disease and insect pressure, fewer pesticides are used reducing the risk of pesticide transport.

Where Used

Seasonal High Tunnel Systems are used on land where crops are grown and an extension of the growing season is needed due to climate conditions and where crops can be grown in the natural soil profile. Permanently raised beds may be installed to improve soil condition, fertility, and plant access, but does not apply to crops not grown in the natural soil profile (i.e. tables/benches, portable pots, etc.).

Beyond season extension, high tunnels can improve crop quality especially with salad greens and can allow for warm season crops such as tomato and cucumber to be produced here in Alaska.

The practice does not include greenhouses or low tunnel systems that may cover single crop rows.

Resource Management System

Seasonal High Tunnel Systems are normally established concurrently with other practices as part of a resource management system for a conservation management unit. Examples include practices such as conservation crop rotation, irrigation water management, nutrient management and pest management. Managing crop residues within the tunnel can help improve soil quality. The cropping rotation used inside the tunnel shall have a positive soil conditioning index and a soil loss of less than the tolerable limit.

The irrigation water applied under the tunnel system shall not exceed the available water capacity of the soil to avoid runoff and leaching below the root zone.

The sides of the tunnel structure shall be down and ends closed when pesticides are applied inside the structure and/or when pesticides are applied to crops adjacent to the tunnel structure.

Operation and Maintenance

An operation and maintenance (O&M) plan must be prepared and reviewed with the landowner or operator. The O&M plan shall provide specific instruction for proper operation and maintenance of the system and shall outline the level of

repairs needed to maintain the effectiveness and useful life of the seasonal high tunnel system. The covered area should be inspected periodically and repaired as needed. In climate conditions where snow loads may damage the structure, the tunnel cover shall be removed at the end of the growing season.

Specifications

Structures shall be obtained from a commercial source. There are many commercially available Seasonal High Tunnel structures on the market. These structures, sold as kits, generally contain all of the required materials and hardware to erect the structure except for the lumber needed for baseboards and end walls.

When selecting a kit individuals should consider factors such as structure design strength for snow and wind loads, the type of anchoring system required, the strength and thickness of the polyethylene cover provided with the kit, venting method (roll-up or drop-down sides) and any warranties provided on the frame or covering. Reputable manufacturers and suppliers should be able to provide this information for the Seasonal High Tunnel Systems that they sell. Individuals should look for manufacturers that offer kits providing warranties of 4 years for the plastic covering and 10 years for the frame structure. Information regarding snow and wind zones can be obtained from your NRCS office.

Seasonal High Tunnel structures shall be of adequate size to obtain 100 percent coverage over the crop area. The structure cover, at a minimum, shall be a made of 6-mil greenhouse-grade, UV resistant polyethylene. Center height of structure shall be a minimum of 6 feet. All materials shall be of significant thickness to withstand the temperature modification for the period required. Tunnel covers shall be removed at the end of the growing season when damage to the structure by climate conditions (snow load or wind) is likely to occur.

The Seasonal High Tunnel System along with necessary appurtenances shall be designed to provide a service life of not less than 4 years.

The Seasonal High Tunnel System structure must be planned, designed, and constructed in

accordance with manufacturer's recommendation.

Runoff shall be directed away from the tunnel structure. Where needed, additional practices shall be installed to prevent water runoff from the high tunnels from ponding around or and/or causing other runoff issues. Surface or ground outlets such as rock pads, rock filled trenches with subsurface drains, concrete and other erosion-resistant pads, or preformed channels

may be used. Surface and ground outlets shall be sized to ensure adequate capacity. Runoff may be captured and used for irrigation purposes.

Site-specific requirements are listed on the Specifications included in this job sheet are prepared in accordance with the NRCS Field Office Technical Guide. See practice standard Seasonal High Tunnel System (798).

Seasonal High Tunnel System – Job Sheet

Landowner _____ Field number _____

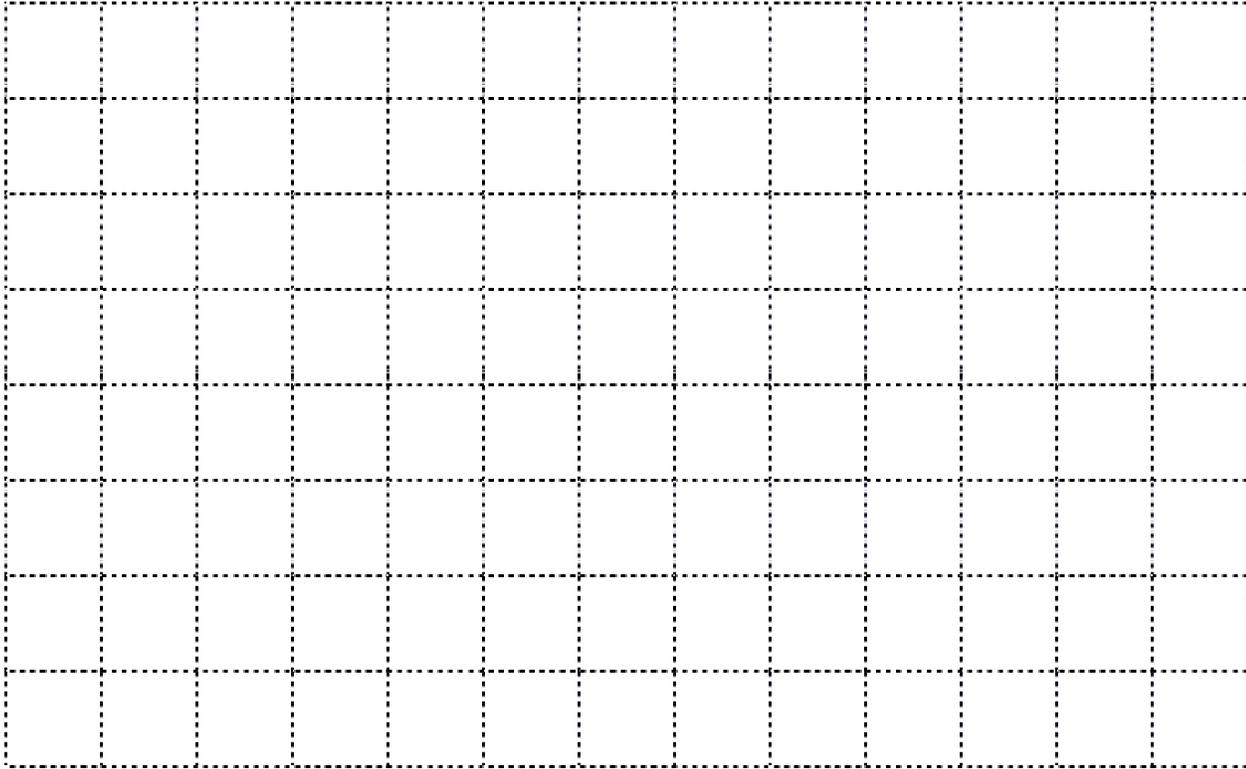
Purpose (check all that apply)	
<input type="checkbox"/> Reduce energy use through local consumption	<input type="checkbox"/> Improve air quality through reduced transportation costs
<input type="checkbox"/> Improve plant quality	<input type="checkbox"/> Improve soil quality
<input type="checkbox"/> Reduce nutrient and pesticide transport	<input type="checkbox"/> Other

Seasonal High Tunnel System –Planning Information		
Crops to be grown:		
Soil Conditioning Index:	Soil Loss:	Soil T:
Irrigated?		
Structure Requirements: <ul style="list-style-type: none"> <input type="checkbox"/> Minimum 6-mil, UV resistant polyethylene cover <input type="checkbox"/> Structure design to provide service life of not less than 4 years <input type="checkbox"/> Bow spacing is _____ <input type="checkbox"/> Square footage adequate to cover all area to be treated <input type="checkbox"/> Minimum center height of 6 feet <input type="checkbox"/> Adequate method for ventilation 		
Dimensions, Square Footage and Type of Seasonal High Tunnel:		
Seasonal High Tunnel System – Site and Installation Information		
Site Considerations: <ul style="list-style-type: none"> <input type="checkbox"/> Perpendicular to Prevailing Winds to Insure Proper Ventilation <input type="checkbox"/> Located in area that is not prone to shade <input type="checkbox"/> Located, if possible, with the axis oriented in a east-west direction <input type="checkbox"/> Topography allows for adequate drainage of roof runoff away from structure or a stable outlet shall be installed <input type="checkbox"/> Located in area that allows for convenient ingress/egress of plant materials and equipment 		
All areas disturbed during construction shall be re-vegetated with:		
Other:		

Seasonal High Tunnel System – Job Sheet

If needed, an aerial view or a side view of the practice can be shown below. Other relevant information, complementary practices and measures, and additional specifications may be included.

Scale 1"= _____ ft. (NA indicates sketch not to scale: grid size=1/2" by 1/2")



Additional Specifications and Notes:

The United States Department of Agriculture (USDA) prohibits discrimination in its programs on the basis of race, color, national origin, sex, religion, age, disability, political beliefs and marital or familial status. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication program information (Braille, large print, audiotape, etc.) should contact the USDA Office of Communications (202) 720-2791.

To file a complaint of discrimination write USDA, Director, Office of Civil Rights, Room 326-W, Whitten Building, 14th and Independence Avenue, SW, Washington, DC 20250-9410 or call (202) 720-5964 (voice or TDD). USDA is an equal opportunity provider and employer.

PLAN CERTIFICATION

This practice is designed and planned according to NRCS AK Standards and Specifications.

Signature of person preparing plan

Date

Signature of NRCS Representative

Date

I agree to install this practice as designed and planned.

Client: _____ **Date:** _____

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Interim Conservation Practice O&M Plan 798

Landowner Name:

Date:

The following items are required for the operation and maintenance of the high tunnel:

- The high tunnel structure will be installed and maintained per manufacturer's instructions.
- Duration of operation of the high tunnel is 4 years. Any disruption in operation due to damage to the structure is in violation of the EQIP contract. It is the responsibility of the participant to repair damage or replace irreparable material to continue high tunnel operation.
- Maintain proper drainage around and away from the high tunnel structure.
- If plastic cover is removed for winter storage, place the material where it will not be handled, moved, or disturbed when cold.

I agree to the above operation and maintenance plan.

Landowner Signature

Date

Signature of NRCS Representative

Date