

# Pack #112, Item 5

# Type: Backgrounder

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**Backgrounder: Post-harvest management of Irish potatoes**

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**Introduction**

***Why is this subject important to listeners?***

Because Irish potato farmers should know:

* The maturity period for potatoes.
* The visible signs that potatoes are ready for harvesting.
* The right time of day and the best weather to harvest potatoes.
* How to harvest potatoes.
* How to sort and grade potatoes.
* The right conditions for storing potatoes.
* The best ways to transport potatoes.
* How long to cure\* potatoes after harvest.

***What are some key facts?***

* Irish potatoes mature 10-14 weeks after planting. At maturity, the leaves turn yellow and begin to wilt.
* When the leaves yellow, the tubers are ready for harvesting. At that stage, the tubers can easily be separated from the stolons\* (horizontal underground stems).
* Vines should be killed by uprooting or cutting at least 10-14 days before harvesting to ensure that the skin of the tubers hardens.
* Whenever possible, harvest in moderately cool and sunny weather. This helps tubers quickly dry and harden and makes it easier to remove soil from the tubers.
* Ensure that the soil in the potato field is loose to avoid potatoes being bruised by soil clods during harvesting.
* When tubers are mature, the skin does not come off when pressed with the fingers.
* Harvest mature tubers by manually pulling the dried plant out or by digging out tubers with hoes, spade forks, or mechanical harvesters.
* If plants are still vigorous when tubers are ready for harvest, remove all plant growth to stop tuber growth and to avoid tubers being deformed and uneven.
* Potatoes should be dry and clean before they are stored.
* Curing potatoes heals their wounds and increases their resistance to decay.
* To protect potatoes against injury and bruising, do not pack potatoes in sacks over 50 kilograms.

*For further information, see documents 1, 6, 8, 9, and 12.*

***What are the big challenges in Irish potato post-harvest management?***

* Pests and diseases that attack stored potatoes.
* Harvesting practices that injure the tubers.
* Harvesting in wet weather, which increases the incidence of disease.
* Storing potatoes in poor conditions.

***Gender aspects of post-harvest management of Irish potatoes***

* In Malawi, potato marketing economically benefits men more than women.
* Across sub-Saharan Africa, women are heavily involved in producing and supplying potatoes.
* In parts of Guinea, women are responsible for most of the manual labour and post-harvest operations on potatoes.
* In Uganda, women are more involved in on-farm potato production and less in marketing and choosing which crops to grow.

*For further information, see documents 3, 5, 7, and 10.*

***Predicted impact of climate change on Irish potato post-harvest management***

* In the North and Central regions of Nigeria’s Plateau state, Irish potato production has stagnated due to the effects of climate change-related phenomena such as drought, floods, and off-season rains.
* In South Africa, drought and hot conditions have reduced Irish potato yields in all production regions of the country.
* In Njoro, Kenya, rising temperatures have increased the incidence of pests in Irish potatoes.
* In South Africa, researchers are predicting that aphid populations in some farming areas of South Africa will increase by 2050, which could increase viral potato diseases.
* In the Mekelle area of northern Ethiopia, prolonged dry spells and late rains have resulted in decreased yields of Irish potatoes.

*For further information, see documents* *2, 4, and 11.*

**Key information about post-harvest management of Irish potatoes**

***Pre-harvest***

Farmers should consider the following pre-harvest practices:

* To reduce diseases and bruises, completely eliminate foliage 2-3 weeks before harvest by using herbicides, by pulling with feet placed next to the stems, or by cutting. In some countries, effective commercial biological herbicides may be available, including those that contain ammoniated pelargonic salts.
* One month before harvest, farmers can harvest and weigh tubers from 10 to 20 plants in order to estimate the total production and income from their land.
* Potatoes are ready for harvest when the skin hardens and doesn’t easily come off when pressed slightly with the fingers.

***Harvesting***

Farmers should harvest potatoes when the plant dries and dies off. At this point, leaves become yellow, brittle, and dry, and skin is thicker and tougher.

* Whenever possible, harvest in sunny and cool weather to ensure that moisture on the tubers dries, and the soil adhering to tubers falls off easily.
* Keep the tubers exposed and spread for two hours until they are dry, before putting in storage.
* If potatoes are harvested during rain, dry in a shed without exposure to direct sunlight before storage.
* After uprooting the dried plant stem, gently harvest the tubers with small hoes, carved sticks, or a spade fork.
* During harvesting, thoroughly check the soil for leftover tubers.
* After harvesting, gather harvest remains such as plants and rotten tubers, and burn away from the plot to prevent contamination of healthy tubers.
* Do not expose harvested tubers to direct sunlight or store in humid conditions that can cause infections such as rot.

***Transport***

Pack and transport potatoes to a location where they can be graded, cured, and stored. Ensure that transport is rapid to protect potatoes from sunburn. When packing for transport, farmers should ensure that:

* Potatoes are packed in sacks not exceeding 50 kilograms to minimize the chances of tubers become bruised and injuring each other.
* Potatoes are packed in one of three types of containers: those with a rigid bottom, flat or padded wire baskets, or padded pails.
* The woven polythene bags that are commonly used are not suitable for potatoes because they do not provide sufficient aeration, and induce rotting. Net or jute bags are recommended.
* Gently pack potatoes in containers or sacks. Throwing tubers into containers results in injuries to skin.
* To prevent injury, place sacks of potatoes gently on trucks or pickups rather than throwing them in.
* Place straw-padded sacks on vehicle floors to cushion potatoes against the impact of shaking during transport, which results in injuries to tubers.
* Tie down loads of potato sacks to avoid shaking during transport.

***Sorting***

Sorting separates good tubers from rotten, diseased and blemished ones, and from other farm waste. Sort by hand or with machines.

***Cleaning***

Thorough cleaning of potatoes on the farm is not recommended, as it can damage the skin. But if the client demands cleaned potatoes, clean potatoes by soaking in water, which allows gentle removal of soil by hand-rubbing the potatoes. Leave to dry in shade or in a well-ventilated holding shed or rack. To ensure thorough drying, farmer should turn tubers once per day.

***Curing***

Curing enables potatoes to heal wounds, and minimizes the chances of post-harvest rot before storage or transport. Cured potato tubers last longer in storage.

* Curing increases resistance to decay and reduces water loss.
* Curing helps control fusarium wilt and bacterial soft rot diseases.

***Grading***

Grading classifies potato tubers by size and simplifies product selection for market sellers. Each country has its own classification system for potato sizes. Grading can be done by hand or with mechanized graders.

* Grading facilitates marketing of potatoes since the farmer and buyer can more easily agree on the price based on the size of the tuber.
* Grading ensures fairness in marketing since prices are determined by the size of the tuber.
* Grading enables buyers to select potatoes based on what they will use them for, e.g., processing into crisps or consumption at restaurants.

***Storage***

Proper storage is pest-and disease-free. Effective storage benefits farmers by allowing them to avoid the low prices caused by overproduction and market gluts immediately after harvest, and to sell later when prices are higher.

* Potatoes should be completely dry and clean during storage. Humidity favours fungal and bacterial diseases, so a store containing potatoes for consumption needs to be well-aerated.
* For effective storage, use the following practices:
	+ A well-ventilated store. Dark stories for potatoes which will be consumed.
	+ Stores should be as cool as possible, so mud-brick houses and thatched roofs will help.
	+ Do not place potatoes in bags, but in crates or loosely heaped.
	+ Stored potatoes should be raised off the ground to reduce humidity.
* Recommendations for storing seed potatoes:
	+ Seed potatoes should be stored in areas with diffused light.
	+ Stack potatoes no higher than 3-4 deep on shelves.
	+ Provide good ventilation.
	+ Use *Lantana camara* leaves to protect against the potato tuber moth.

***Types of storage***

Before potatoes are stored, farmers should fumigate storage areas to kill pests. Farmers should store only clean potatoes in the best physical condition. Well-stored potatoes can last up to four months.

*Sheds***:** Potatoes can be heaped in a well-ventilated wooden shed and covered with dry straw. Shed floors can be wooden or a level platform of sand, and should be disinfected before introducing potatoes. Potato heaps should not exceed two metres in height.

*Rooms***:** Farmers can store potatoes on wooden racks or in woven baskets placed on racks in well-ventilated rooms. Do not store for more than three weeks in bags. Bags should lie on their side rather than being upright.

*Granaries:* Farmers can also store potatoes in raised, well-ventilated granaries, either in heaps or in large wooden crates or woven baskets.

* Regularly monitor stored potatoes for infestation by potato tuber moths. If tuber moths are detected, apply pesticides. Place *Lantana camara* leaves in between the potatoes to repel potato tuber moths.
* Monitor potato tubers for diseases such as silver scurf, black dot, skinspot, dry rot, and soft rot.
* Inspect potatoes regularly and remove rotten tubers.

*For further information, see documents 1, 6, 8, 9, and 12.*

**Definitions**

*Cure:* Toughening / hardening a potato's skin and extending its storage life by storing in a well-ventilated area that's cool and dark.

*Stolon*: Soft, horizontal underground stems that grow just below the surface of the soil.

**Where can I find other resources on this topic?**

*Documents*

1. AGMarknet, undated. *Post Harvest Profile of Potato.* <https://agmarknet.gov.in/Others/profile-potato.pdf>(851 KB)
2. Bulus, H. and Nimfa, D.T., 2017. *Effects of Climate Change on Irish Potatoes Farming in Plateau: A Study of North and Central Zones of Plateau State, Nigeria.* <http://ijecm.co.uk/wp-content/uploads/2017/11/51117.pdf> (605 KB).
3. Food and Agriculture Organization (FAO), 2010. *Strengthening potato value chains.* <http://www.fao.org/3/i1710e/i1710e.pdf> (5.67 MB)
4. Gebremedhin, Y. and Berhe, A. A., 2015. *Impact of Climate Change on Potato Yield (Solanum tuberosum L.) At Mekelle Areas, in Northern Ethiopia.* [https://www.idosi.org/wjas/wjas11(2)15/2.pdf](https://www.idosi.org/wjas/wjas11%282%2915/2.pdf) (206 KB)
5. Mbowa, S., and Mwesigye, F., 2016. *Investment Opportunities and Challenges in the Irish Potato Value Chain in Uganda.* <https://ageconsearch.umn.edu/record/253560/files/14%20Investment%20opportunities%20and%20challenges%20in%20the%20potato%20value%20chain%20in%20Uganda.pdf>. (3.52 MB)
6. Meyhuay, M., 2001. *Potato: Post-harvest Operations.* <http://www.fao.org/fileadmin/user_upload/inpho/docs/Post_Harvest_Compendium_-_Potato.pdf> (2.13 MB)
7. Mudege, N. N., 2015. *Gender norms and the marketing of seeds and ware potatoes in Malawi.* <http://agrigender.net/uploads/JGAFS-122015-2.pdf> (530 KB)
8. National Potato Council of Kenya, 2013. *A Guide to Potato Production and Postharvest Management in Kenya.* <https://npck.org/Books/potato%20production%20manual.pdf> (2.49 MB).
9. Shrestha, H.K., 2016. *Potato Seed Tuber Production Techniques Manual.* <https://www.jica.go.jp/nepal/english/office/others/c8h0vm0000bjww96-att/tm_4.pdf> (2.38 MB).
10. Tatwangire, A. and Nabukeera, C., 2017. *Technical report Market and Value Chain Analysis of Ware Potato from Eastern Uganda with a focus on postharvest management practices and losses.* <https://cgspace.cgiar.org/bitstream/handle/10568/89337/RTB-Endure-TReport-Market-value-chain-ware-potato-Uganda.pdf?sequence=1> (4.15 MB).
11. Walubengo, D., undated. *Community-led action to use forestry in building resilience to climate change: a Kenyan case study Njoro Division, Nakuru District, Kenya*. <https://pubs.iied.org/pdfs/G02310.pdf> (290 KB).
12. Wasukira, A., et al, 2017. *Ware potato harvesting and storage techniques Guidelines for harvesting and storage management of ware potato.* <https://cgspace.cgiar.org/bitstream/handle/10568/82788/RTB-Endure-Ware-Potato-Harvesting-and-storage-techniques.pdf?sequence=1&isAllowed=y> (2.94 MB).

## Acknowledgements

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