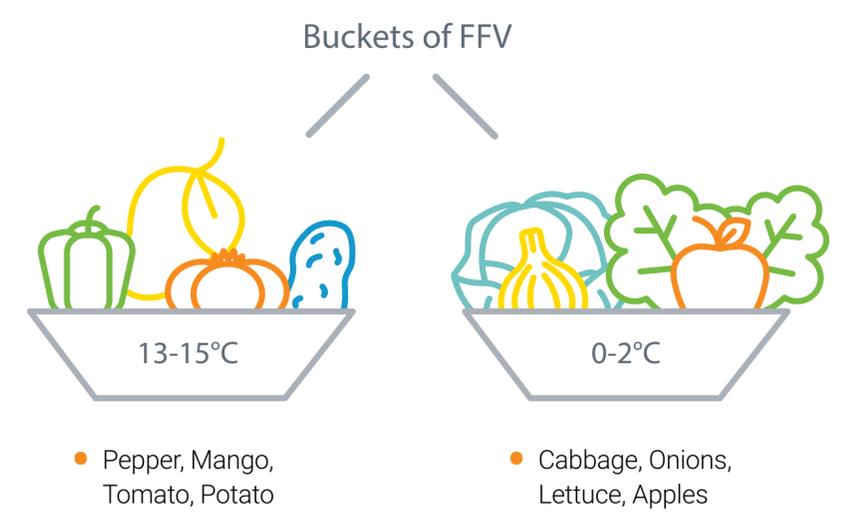


# Types of Cold Chain in Off-Grid Areas



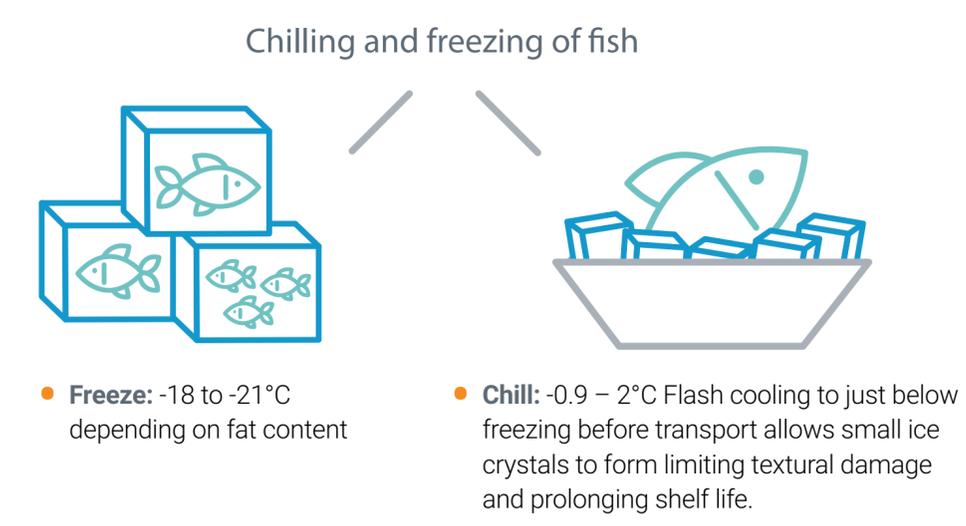
## Fresh Fruits, Vegetables, and Flowers

- FFV have significantly different cooling requirements for storage. The following table shows some examples of different cooling requirements for various fruits and vegetables. For example, the recommended storage temperatures for bananas, cucumbers, and tomatoes are somewhere between 10-15°C. However, the recommended storage temperature for apples, cabbages, and lettuce are much lower – close to 0°C.



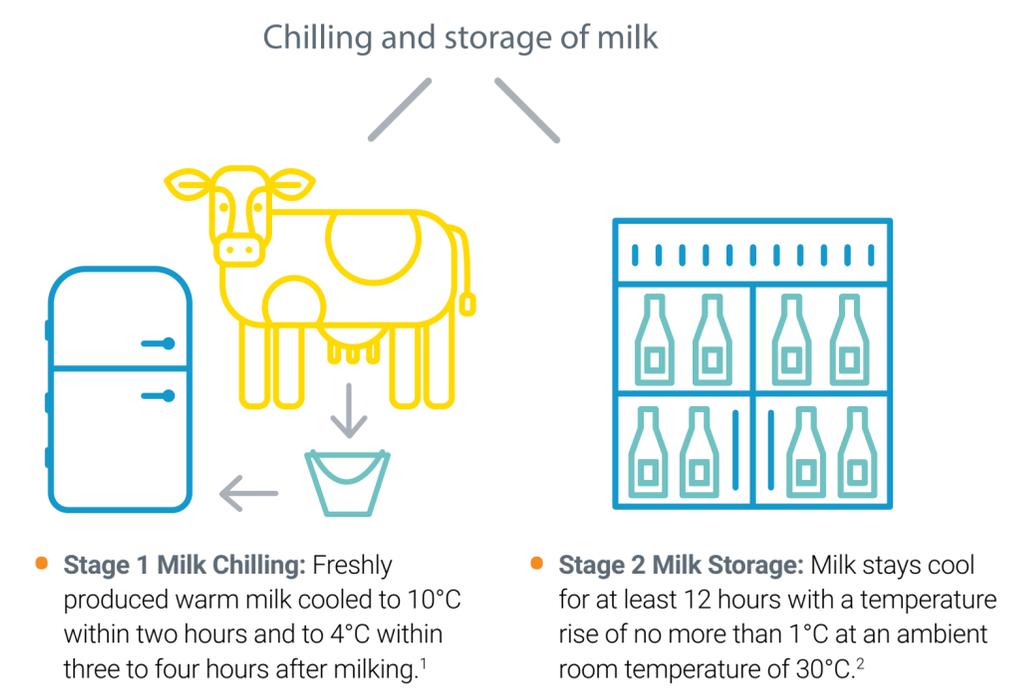
## Meat and Fish

- Meat and fish, once slaughtered and processed, are either frozen or chilled just above freezing as they make the journey to their final resting plate. The cooling process usually begins with one of three approaches: liquid cooling, ice slurry cooling, or combined blast and contact cooling. Fatter fish are typically stored at -21°C while leaner fish is cooled to -18°C. While freezing is the most common approach to fish cold transport, the freezing process can cause ice crystal formation in the protein leading to drip-loss, reduced ability to hold water, and textural deterioration. To avoid the negative effects of freezing some fish cold chains use ice glazes and transport conditions that range from -0.9 – 2°C.



## Milk Chilling and Storage

- Freshly harvested milk contains few microorganisms. However, the microbial growth will rapidly increase under warm temperature, and international organizations like WHO and FAO have developed detailed guidance on proper chilling and storage of milk to account for this:



1. FAO. (2016). Technical and investment guidelines for milk cooling centres. Chapter 6. Refrigerated milk cooling tanks.  
2. Ibid.