Clay Pot Cooler Training Program in Niger

Clay pot coolers provide a cool and humid environment, without requiring electricity, that is favorable for preserving fruits and vegetables. These simple devices are particularly valuable in hot and dry climates where many fruits and vegetables spoil quickly.

CoolVeg led the design of a clay pot cooler training program, which was implemented as part of the USAID Yalwa Activity to improve the postharvest storage capabilities of households in the Maradi, Tillabéri, and Zinder regions of Niger. Five training or trainers (ToT) workshops and a total of 305 training sessions were conducted in the Maradi, Tillabéri, and Zinder regions of Niger. The training sessions were led by 23 union members with support from technical assistants (TAs) who attended a Training for Trainers (ToT) workshop, directly providing information about the assembly and use of clay pot coolers to 7,239 training participants.

A series of monitoring and evaluation activities were conducted to measure outcomes related to participation in the training program, clay pot cooler usage, food loss, fruit and vegetable consumption, time spent purchasing fruits and vegetables, sharing of information with others in the community, and the sales of clay pot coolers by clay pot makers and sellers. The endline survey with clay pot cooler training participants in Maradi and Zinder served as the primary avenue for measuring the program's impact.

Figure 1. Photos of the hands-on session at the ToT workshop in Maradi. Left: Mariame Sogoba (World Vegetable Center) explaining how clay pot coolers work and how they are assembled. Right: ToT workshop participants placing jute sacks on top of a recently assembled clay pot cooler during the first day of the ToT workshop in Maradi.

Key Results and Outcomes of the Clay Pot Cooler Training Program

Prior to attending the clay pot cooler training session, most participants were placing fruits and vegetables near their water pot, on wet sand, or in a basin covered in a wet cloth. These techniques utilize evaporative cooling to improve shelf-life, but not as effectively as a clay pot cooler. Less than 2.5% of respondents reported using a refrigerator for fruit and vegetable storage.

Among the 533 training participants interviewed more than one year after attending a clay pot cooler training session, 89.3% reported that they were using a clay pot cooler for fruit and vegetable preservation. With only 26 out of 533 respondents (4.9%) citing a lack of money or inability to find the relevant materials to obtain a clay pot cooler, the technology is both **accessible** and **affordable** for over 95% of the respondents who attended a Yalwa clay pot cooler training.

Among the 3 clay pot cooler designs included in the curriculum, the *clay pot-in-plastic dish* was the most commonly used type of clay pot cooler (79.5% of users), followed by the *clay pot-in-clay dish* (20.9% of users) and the *clay pot-in-clay pot* (1.5% of users). The *clay pot-in-clay pot* type of cooler – or Zeer pot – has been promoted by Mohammed Bah Abba in Nigeria and Movement e.V. in Burkina Faso, and others over the past 20 years, primarily through supporting clay potters to make and sell the devices. The *clay pot-in-dish* designs, which are modifications to the more well-known *clay pot-in-pot* type of cooler, have only recently been promoted by the CoolVeg team and collaborators over the past 5 years. The simplicity and the wide availability of the materials for *clay pot-in-dish* coolers are the primary reasons for the significantly higher levels of usage.

Clay pot-in-clay pot (1.5%)

Clay pot-in-plastic dish (79.5%)

Clay pot-in-clay dish (20.9%)

Figure 2. The three clay pot cooler types introduced in the training program, and the usage rates reported. Fourteen (14) respondents reported using more than one type of clay pot cooler, resulting in a total greater than 100%.

Clay pot cooler users were asked if they stored the following fruits and vegetables and about the shelf-life with and without using a clay pot cooler: tomatoes, sorrel leaves, carrots, amaranth, mangoes, moringa leaves, and baobab leaves. The average shelf-life for each of these foods was less than 2 days in the respondent's previous storage method and was more than three times longer (more than 6 days) when stored in a clay pot cooler. These improvements are enabled by the cool and humid environment inside the clay pot cooler.

Figure 3. Left: Leafy greens, African eggplant, and carrots stored in an open basket for 3 days; Right: Leafy greens, African eggplant, and carrots stored in a clay pot cooler for 3 days.

These shelf-life improvements enable clay pot users to benefit in several areas of their daily lives. Among the clay pot cooler users surveyed:

- 95% reported having less food waste
- 88% reported spending less time traveling to the market
- 85% reported eating more fruits and vegetables

Reductions in food waste are directly made possible by the improved storage environment of a clay pot cooler, allowing households to avoid food spoilage and save money.

Longer shelf-life allows for more fruits and vegetables to be bought at once, reducing the number of times needed to go to the market. This reduces the time burden on women and girls, who can then spend more time on other activities such as attending school, working, and engaging with family and the community. Clay pot cooler users reported taking an average of 62% fewer trips to the market – 3.5 trips per week reduced to 1.3 trips per week after using a clay pot cooler – which amounts to an average time savings of 74 minutes per week.

The longer shelf-life provided by clay pot coolers can allow families to increase their fruit and vegetable consumption through multiple routes. For example, less waste will make more food available for the consumer, allowing for greater consumption of these nutritious foods. Additionally, for families who are limited in the number of times they can go to the market each week, longer shelf-life can allow them to buy more fruits and vegetables on each trip and consume more of these nutritious foods during the week.

Beyond their own usage, most training participants showed eagerness to share ideas about clay pot coolers with others in their community, with 73% of training participants reporting that they had shared information about clay pot coolers with others in their community. These 391 survey respondents reported telling an estimated total of 5,163 others about using clay pot coolers, an average of more than 9.6 additional people learning about clay pot coolers per person trained. Eighty percent (80%) of these respondents reported that they observed their neighbors and family members who they told about clay pot coolers and are now using them for fruit and vegetable storage.

Extrapolating these results to the training cohort, an estimated 5,324 training participants in Maradi and Zinder are clay pot users, and over 57,000 people have learned about clay pot coolers from training participants. The estimated total number of new clay pot users is dependent on several factors, with the usage rate of those who learned about using clay pot coolers for fruit and vegetable storage from training participants having the greatest influence. Assuming a usage rate of 20% among this group, and a baseline clay pot cooler usage rate of 5%, there are an estimated 13,562 new clay pot cooler users, and if this usage rate is increased to 80%, the estimated number of new clay pot cooler users is 39,075.

The cost of the capacity building and training aspects of the program in Maradi and Zinder was approximately $70,000 yielding a cost per new clay pot cooler user ranging between $1.79 for 39,075 new users and $5.16 for 13,562 new users. Given that a significant portion of the program cost was for the development of a cohort of trainers, the existing trainers can continue scaling the program improving the cost-effectiveness going forward. When only considering the cost of the training session the cost per new clay pot cooler user is between $0.64 for 39,075 new users and $1.84 for 13,562 new users.

Name of activity	Cost of each activity	Number of each activity	Total cost of each activity	Number of clay pot cooler users		
				13,562	26,319	39,075
Training session	$99.45	251	$24,962	$1.84	$0.95	$0.64
ToT workshop (estimated)	$5,000	3	$15,000	$2.95*	$1.52*	$1.02*
CoolVeg team training support	$30,000	1	$30,000	$5.16**	$2.66**	$1.79**

Figure 4. An analysis of the costs associated with the clay pot cooler training program and the cost-effectiveness for three estimates of the number of clay pot cooler users. The three columns on the right, highlighted in green, are the cost per clay pot cooler user. The values ($/user) in the second row (noted with a "*") include the cost of both the training sessions and the ToT workshops. The values ($/user) in the third row (noted with a "**") include the cost of all three activities (the training sessions, ToT workshops, and the CoolVeg team's support).

Conclusion and Next Steps

Results from the survey responses indicate that the clay pot cooler training sessions were successful in stimulating the usage of clay pot coolers among the training participants and within their communities. The results shown here, in combination with recent results from Mali, indicate that two innovations make this new approach scalable and sustainable:

- **The identification of the *clay pot-in-dish* type of clay pot cooler and the validation of its ability to provide shelf-life benefits.** This is critical because the materials needed for a *clay pot-in-dish* cooler are much easier to obtain in most rural settings than those for a *clay pot-in-pot* cooler, or "Zeer pot", and do not require clay potters to make custom pots.
- **Generating both supply and demand for clay pot coolers through a training program**. The training program not only builds capacity among the training participants but also lends credibility to the ideas behind clay pot coolers, stimulating both supply (clay pot sellers) and demand (household clay pot cooler users). Furthermore, the *clay pot-in-dish* design enables potential users to make a clay pot cooler without a clay pot maker or seller being aware of the technology.

This clay pot cooler in Niger training program has successfully scaled up the previous program in Mali by more than 20 times the scale while achieving similar results. With a qualified cohort of trainers already in place in Maradi, Tillabéri, and Zinder, additional resources could allow these efforts to further scale at a lower cost per beneficiary than these initial training cohorts.

In addition to replicating the program in new regions, more evidence is needed to encourage governments, aid agencies, and implementers of development programs to invest in replicating this clay pot cooler training program at larger scales. Additional impact evaluations need to be conducted to gain a better understanding of how clay pot coolers can help provide better fruit and vegetable storage for more communities, particularly quantitative assessments of fruit and vegetable consumption and waste. Furthermore, given the large number of indirect beneficiaries, there is a need for a quasi-experimental or randomized impact evaluation to capture the impact of this training program on communities.

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Contact: Eric Verploegen eric@coolveg.org