BRIEF No. 3

Economics and Promotion

Insights for Program Design

Successfully promoting cost-effective seed storage technologies rests on the assumption that farmers make rational choices based on an understanding of the costs and benefits of different storage options. Benefits from reduced losses with improved seed storage mirror many benefits from reduced losses in grain storage. Additional unique benefits in seed storage include lower seed use (sowing rate) and better crop yield due to improved germination and vigor. Key factors in promoting seed storage include demonstrations of the technology, use of subsidies and collaborating with public and private actors.

Introduction: Intervening in post-harvest systems in developing countries

Post-harvest aid interventions in developing countries have generally been clustered in two phases. Initial development assistance focused on central storage systems and quality control at purchase points (Hall 1969). Later aid trends placed emphasis on marketable surplus and improving traditional post-harvest practices (De Lima 1975, 1987). Both types of interventions gave prime attention to technical solutions rather than underscoring the social and economic basis for post-harvest practices.

Supporting post-harvest seed and grain technologies may appear economically beneficial at the design phase of a project and even during the project phase when there are subsidies provided to producers, suppliers, and consumers for post-harvest technologies.[1] However, when subsidies and project support ends, consumer demand and adoption of the technology can falter and the supply chain for the technology may also fail. This occurs when post-harvest technology cannot be produced or supplied profitably to the farmer without the subsidy or when the farmer cannot afford the cost of the post-harvest technology without the subsidy. Several of the cases studies financed in the On-Farm Seed Storage Project (see *introductory brief*) involved subsidies and are examined in the following pages. While it may be premature to assess the sustainability of these seed and grain storage technologies and project approaches, the significant levels of the subsidies could prove problematic to transfer onto producers and consumers post-project.

Farmers may reject a technology for a combination of economic and social reasons. Also, the local environmental conditions and enabling environment may be insufficient. A key weakness in the design of many post-harvest initiatives is that the benefits do not accrue fast enough for participants to recognize the value of the technology. Farmers may also not recognize or be willing to accept the associated investments of time and money needed to continue with the technology.

[1] *In this brief, we focus on the material aspects of seed storage technology. Technology as a concept also has an equally strong knowledge component: e.g., how to use improved practices, if they are effective, if the user finds such practices acceptable.*

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Key message

- Improved storage technologies may be technically effective but not economically viable. In both the short and the long term, any technical gains have to be weighed against other factors which may affect technology use and function. Key is whether farmers are willing to absorb costs, when subsidies are withdrawn, and whether the environment exists to sustain the technology when a project ends.

Helping farmers to understand the cost and benefit of grain and seed storage technology

For technology to be adopted, farmers need to understand how to use the technology, and how to quantify its benefits. NGOs and practitioners can help farmers make decisions on whether and when to invest in new technologies based on sound economic analysis of the opportunities and challenges of the investment.

With the right information, economic assessment of grain and seed storage can be estimated before and measured exactly after the technology introduction. Returns to farmers for seed and grain storage are similar, with seed requiring a few extra considerations. As seed and grain are stored together for many crops, it is often difficult to separate seed from grain in a cost benefit analysis. Estimating dry weight loss, quality loss, and price gain per unit of stored seed/grain are major factors for determining economic benefits of new technologies. These need to be balanced against the cost of the technology, i.e., money, labor, and in-kind contribution.

Largely ignored by practitioners but vitally important to farmers, one must also consider the opportunity cost (or time-value) of money during the storage period. This is the cost to finance storage as opposed to selling the seed/grain immediately after harvest. (Note also that prices markedly dip just at harvest, as opposed to selling later, so there are numerous factors to balance.) By not selling after harvest and deciding to store, a farmer effectively loans himself the money that he could have made selling the grain early. He could have used this revenue for many things such as school fees, health care or investments in other income generating activities (such as animal rearing), and therefore the time value of this money must be taken into account. Incorporating the methods from Jones, Alexander, and Lowenberg-DeBoer (2014), it is possible for practitioners, in consultation with farmers, to *plan ahead* which variables will be necessary for analysis and *execute* a before-and-after assessment of economic benefits to storage.

Fundamental questions to ask for an economic analysis regarding stores and market conditions:

A series of basic questions can help orient initial economic analysis relatively quickly:

- **Overview storage plan**

? What is the immediate price of the commodity at harvest (base price) and what is the price after the storage period (i.e., in the planting season, after prices typically rise)?

? What is the length of the desired storage period (i.e., how many months)?

? What quantity (kg) does the farmer need to store?

These questions can tell you how much of a *total value* increase the grain stock could have if well preserved. We will use an Ethiopian pit storage case study as an example for calculation (case referenced in *introductory brief*). Sorghum prices are noted in the intervention period to increase from US $0.189/kg to about US $0.405/kg eight months later. This is a 114% increase in price. Farmers in the trial for new Pit Storage Bags, a plastic liner impeding typical grain losses from moisture and mold contamination, store about two metric tons (2000 kg) of grain after harvest. Therefore the value of the grain is US $378 (2000 * 0.189) at harvest, which rises to US $810 (2000 * 0.405) after eight months of storage. This is a revenue increase of US $432.

In reality, a farmer may not sell 100% at harvest or 100% in the period of the best prices (typically after significant storage, before the following harvest). Rather, many farmers sell smaller quantities as cash is needed. The simplified example above should be used as an illustration to help farmers assess their maximum potential earnings with storage. A more incremental approach to calculating the return on investment may be necessary to reflect more realistic selling practices.

Next, questions regarding the cost and performance of old and new storage technologies should be considered:

- **Old Technology**

? What is the total cost, per year, of the old technology? (materials + labor)

? What are the weight (kg) losses (%) in the storage period using the old technology?

? Is there a price reduction (%) for remaining grain that has visible damage compared to clean grain? (i.e., is the price $0.30/kg for clean undamaged grain, and 10 to 20% lower for grain with the damage level allowed by this technology?)

- **New Technology**

? What is the total cost, per year, of the new technology? (materials + labor)

? What are the weight (kg) losses (%) in the storage period with the new technology?

? Is there a price reduction (%) for remaining grain that has visible damage (compared to clean grain)?

The cost of the technology should include all materials and labor (e.g., digging pits) and should depreciate for the number of years of useful life. If insecticide is applied to bagged maize, then one must consider both the cost of the insecticide and the cost of the bags used. NOTE: It is important to remember, for example, that even if a US $100 metal silo can be used for 15–20 years, the depreciated cost per year ($5–7) may not reflect the difficulty for many cash- and credit-constrained farmers to pay this large US $100 sum up-front.

The effectiveness of the technology to preserve grain quality considers both components of revenue, namely quantity and price. Weight (quantity) loss occurs, for example, as storage begins with a 100kg bag of maize and then, after six months of storage and insect infestation, the bag weighs 95kg. Price loss occurs when damaged

Key message

- Practitioners must start by understanding the losses incurred by farmers and the value of these losses to the farmer. They must plan ahead to ensure they are collecting the basic economic variables needed to provide proper economic evidence of technology benefits. This includes physical loss and quality (price) loss in grain/seed with both old and new technologies as well as the relative costs of those technologies (i.e., the cost of investing in the new technology relative to the cost of investing in the old technology). Also important is the change in price of grain/legumes from harvest to planting during storage. If this does not occur, the economic value of the post-harvest technology can be greatly over or understated and this has ramifications for technology design, promotion, and ultimately level of adoption.

grain is not offered the same price as undamaged grain. In Ghana, maize with 20% damaged grains after many months of storage was shown to receive about a 15% lower price than undamaged maize (Compton et al., 1998). Additionally, a key point in the Burundi case study (listed in the introductory brief) is that hermetically stored, high quality bean seed received a premium price – indicating that quality is appreciated and rewarded in the market.

Computing the financial and economic returns to storage technology

Here we share an example (a theoretical one) of how financial and economic returns in the use of a given technology might be practically computed. (Example from Compton et al., 1998).

Assume a farmer has 500kg of maize and currently uses a storage technology (like insecticides) that allows 5% weight loss and results in a 15% lower price for the remaining damaged maize. After storage, this farmer would have a final revenue of:

Quantity after storage loss: (500kg - 25kg [5% weight loss]) = 475kg

Price after storage loss: ($0.30/kg - $0.045/kg [15% price loss]) = $0.255/kg

Revenue after storage loss: ($475/kg x $0.255/kg) = $121.13

This $121.13 in revenue with damaged grain compares to $150 if no losses occurred. Therefore the *total value loss* is not just the 5% in weight loss. For a marketing producer it is the combined (compounded) loss in price and quantity that, in this example, is actually 19.25% total value loss.[2]

The cost of the new (more effective) technology is then compared to see if the benefits of preventing this storage loss exceed the costs of the storage investment. This should be explained to farmers in a simple way to help them understand how they may be experiencing losses in both quantity and price with older technologies. They will then have more information to decide whether adopting a new technology that reduces these losses will be more profitable.

The percent return which farmers make on their storage investment should be calculated for each possible technology. The equation is as follows:

$$\text{Financial Rate of Return (\%)} = \frac{\text{(Potential Revenue at Harvest - Revenue after Storage)}}{\text{(Potential Revenue at Harvest + Storage and Marketing Costs)}}$$

A final important consideration is the *time value* of money, also known as the rate of opportunity cost of capital (OCC) or the discount rate. You may also think of this as the rate of interest on a loan. While OCC rates in developed economies are generally estimated at about 2–10%, the low credit availability in most developing countries requires a much higher OCC rate. Informal annual interest rates in developing countries may be 25–50%, and in some cases up to 100% (Buckley 1997; Stewart et al., 2010). Poorer farmers most likely face higher OCC rates. Hence, as a test, it is more robust to use 25% OCC for better-off farmers and even 50% OCC for poorer farmers. If storing for six months, then the simplified *annual* OCC rate of 25% or 50% would be discounted by half (6/12 months = 1/2). The procedure to determine economic returns on storage, considering this time value of money, is as follows:

$$\text{Economic Rate of Return (\%)} = \text{Financial Rate of Return (\%)} - \text{Annual rate of OCC (\%)} * ((\text{months of storage})/12)$$

[2] *This is computed as (100% - 5%) * (100% - 15%) = (95%) * (85%) = 80.75% of retained value OCC (%) * ((months of storage)/12)*

The economic rate of return for each technology should be above zero to recommend this technology for income generating purposes. This positive value means it has broken the "profitability threshold" described by each level of OCC. If the economic return is below zero, this means the farmer should not invest in the storage technology and should consider other investment possibilities to earn income (such as livestock rearing). It is important to remember that new technologies may be efficient in reducing losses, but may not be worth the investment. Farmers may be better off selling grain immediately at harvest than making a storage investment and waiting six to nine months to achieve a return (especially those with higher OCCs).

The economic rate of return of both the old and new technology should be compared to see which is higher, and therefore, which is more profitable for farmers. For example, in the Ethiopian storage pit case study, both the old and new technology had positive economic returns of under 25% and 50% OCC using old and new technologies respectively. This means grain storage could be profitable, even considering the time value of money, with fairly high losses using old technologies and with very low losses using new technologies. The new technology clearly outperformed the old technology, however, and the increased cost of investment was justified given the comparative economic advantage. This advantage was apparent even without information on price discounts, which would have further underscored the benefits of increased storage protection. For a detailed example of one profitability determination, see Table 1 (with Appendix 1 showing the actual formulas for calculations).

Table 1: Simplified spreadsheet example for use in data analysis software (such as Microsoft Excel)

	Sell at Harvest	Storage Product A	Storage Product B
Harvest (kg)	100	100	100
Months stored	–	6.0	6.0
Dry weight losses (%)	–	2.0%	5.0%
Quantity marketed (kg)	100	98	95
Price at harvest ($/kg)	0.30		
Commodity price for clean, undamaged grain after storage period ($/kg)		0.50	0.50
Total price discount for grain damage present (compared to clean grain) (%)	–	5.0%	20.0%
Final price received after storage ($/kg)		0.48	0.40
Commodity revenue ($)	30.00	46.55	38.00
Total technology cost (for total quantity stored for entire storage period) ($)	–	3.00	1.00
Rate of OCC (ex. 25% or 50%)	–	25%	25%
Total OCC adjustment ($)	–	4.13	3.88
Economic gain on storage ($)	–	9.43	3.13
Economic return to storage (%)	–	28.6%	10.1%

Source: Adapted from Jones, Alexander, and Lowenberg-DeBoer (2014).

Key message

- Total value losses considering quality (price) loss can greatly exceed physical loss and indicate greater benefits of storage technologies. Financial rates of return and economic rates of return (considering the time value of money) can be easily computed given adequate information. Practitioners can help farmers make investment decisions based on sound financial and economic analysis.

Computing returns on storage investment (for seed)

The returns on seed storage are computed the same as above, with the addition of improved germination, plant vigor, and yield values. Resulting yields (of the same seed) stored using old and new storage technologies may be tested, though significant care is necessary to provide the exact same growing conditions to isolate the effect of the seed management. The value of this yield increase can be quantified using market grain prices. The resulting yield gains from maintaining undamaged and high quality seed may drastically exceed the monetary cost of preserving the seed grain itself. An economic benefit may also be evidenced in reduced sowing rates. This latter value can be quantified by using the quantity saved and the prevailing price for seed of that quality.

As illustrated by the profitability equations, estimating returns on storage can be difficult and such analysis may be conducted poorly by practitioners. Typically the returns are grossly overestimated because the opportunity cost of capital – the cost of not selling seed or grain at harvest as opposed to selling or using it many months later – is not factored into the analysis to reduce the estimated benefits. Before helping farmers to understand the benefit of a technology, the sponsoring and implementing organizations should do a simple but careful scenario analysis to estimate returns under different contexts.

Key message

- Economic returns on seed storage should significantly exceed returns for grain storage due to the multiplying effect of improved germination, vigor, and resulting yields. However, these returns can be difficult to quantify as the analysis requires collecting data over several seasons and, for some crops, multiple years. Sometimes, simple proxies like qualitative assessments of changes in seed security and seed quality among participating farmers, may give more useful insights than efforts to quantify precise returns to seed storage.

Promoting storage technology

The discussion of storage technology is often driven from an engineering and economic perspective and much less a social perspective. We should remember that culture plays a significant role in linking technology and society. How technologies are identified and adopted takes into account the economic as well as the political, social and cultural dynamics. A first step in the direction of identifying appropriate technologies is to explore which particular parties and interests are mobilized around change or adherence to specific technologies. The final selection of a technology cannot be reduced to the single interest of one actor, but instead results from a dynamic balance of power among and between a range of social actors.

Training, communication, and effective demonstrations

For farmers to adopt a technology they need to understand how to use the technology. The more common means of familiarization include: hands-on direct training for farmers; promotion and media campaigns; and technology demonstrations. The case studies united under the On-Farm Seed Storage Project (full list, *introductory brief*) describe how direct farmer training and demonstration of the technologies were key activities of the project. However, it is difficult to assess the extent to which training and demonstrations enabled farmers to understand how to properly use the technology (for example, how to maintain a hermetic seal and its importance) or to value the benefits of the technology (for example, the impact on germination and yield from well stored seed).

A summary of some key activities to promote grain and seed technology is found in Table 2. Direct farmer training refers to classic farmer training based on a structured curriculum and involving a series of related training events.

Promotion and media campaigns refer to activities that communicate the storage technology and its benefits. Technology demonstration refers to a set of discrete activities that may be a sub-set of farmer training, and which puts emphasis on assessing the benefit of a storage technology – that is, letting farmers observe directly some of the concrete results.

Table 2: Common means for promoting grain and seed storage technology

	Direct Farmer Training	Promotion & Media Campaigns	Technology Demonstration
Key Question	Is the technology understood and contextually appropriate? Can farmers manipulate the technology to achieve its maximum benefit?	Are famers aware of the technology? Do farmers know where to go to get more information?	Do farmers grasp the potential benefits of the technology?
Key Outcome	A critical mass of farmers are exposed to and trained on the storage technology.	Farmers demand more information about the technology and make follow-up inquiries to key informants based on the ad campaign.	Farmers see, and implicitly and explicitly understand the benefits and value of the technology.

Technology demonstrations may be difficult to conceptualize and execute but can be very effective in creating farmer demand for information relative to a technology and for the technology itself. For seed storage technology, the most common means of demonstration is to compare germination rates of seed selected, handled, and stored with the new technology with rates of seed managed under the standard technology. Effort should be made to employ these demonstrations effectively, that is, to record carefully the different germination rates and resulting yields. These comparisons provide critical information in determining the success of a seed storage program.

Key message

- For farmers to adopt a technology, they need to understand how to use the technology and value the benefits. The more common means of familiarization include: hands-on direct training of farmers, promotion and media campaigns, and technology demonstrations. Storage technology benefits accrue over time, and discrete, well-organized trials showing reduction in post-harvest loss, improvement in germination and improvement in yield are all necessary for farmers to appreciate the value of the benefits of improved grain and seed storage.

Using subsidies to create demand-side interest and supply-side incentives

Subsidies can promote access for a new technology by directly subsidizing consumers through vouchers to stimulate demand. Subsidies can also be used to promote availability of a new technology by providing a direct subsidy to a manufacturer/producer in order to stimulate supply by lowering the cost of production, and thus, lowering the price. It is common for subsidies in agriculture programs to include both demand- and supply-side subsidies. The challenge is to identify the optimal point for both the demand- or supply-side subsidy. If employed, the subsidy should be enough to stimulate demand and supply, and the functioning of a value chain for the goods and services subsidized, but not too much as to lead to a market failure when the subsidies are reduced or terminated. Country-based projects of the On-Farm Seed Storage Project made use of rather high subsidies for some of its storage technologies (Table 3). The projects focused principally on proof of concept in technical design rather than on issues of cost recovery and sustainability. Programs aiming principally for longevity would probably make more conservative use of subsidies.

Table 3: Summary of On-Farm Seed Storage Project interventions and subsidy use

Country	Description of technology	Estimated total cost (in US$) of technology – labor and materials	Percentage of technology cost subsidized by project – estimate
Afghanistan	Ventilated underground pit for potatoes	22	35
Ethiopia	Above-ground improved storage with modifications for maize and sorghum	100	50
Timor-Leste	Meta drum for maize	35	80
Burundi	Variety of hermetic storage products – the main one being PICS sacks (multi-layer, made of 2 polyethylene liners and one outside woven polypropylene bag)	2	100
Burkina Faso	Variety of hermetic storage products – the main one being PICS sacks (multi-layer, made of 2 polyethylene liners and one outside woven polypropylene bag)	2	100

Voucher schemes, by which storage technologies are partially paid for by a voucher provided by the implementing NGO, were a common feature in all of the On-Farm Seed Storage Project case studies. Studies on vouchers and demand-side subsidies consistently underline the need for effective targeting mechanisms to ensure that voucher schemes benefit a specific set (i.e., specific demographic) of non-users of the technology. Without careful attention to targeting, vouchers could be unintentionally skewed to reward certain farmers or be deliberately allocated in ways that strengthen existing power relations and/or favor specific political interests. Demand-side subsidy schemes should have transparent mechanisms and a degree of 'ritual' – in design and implementation approach – to garner support and buy-in from local customary institutions. A valuable means to assess the extent of technology uptake and scaling potential is to track the percent of farmers (and their demographics) that pays full price for the technology or adopts the technology without receiving a clear subsidy. Storage investments that have significant upfront costs, such as the improved crib concept by GOAL Ethiopia (about US $100 per unit), may present significant cash flow challenges. Cost challenges can be alleviated to some extent by credit programs such as internal savings and lending schemes which help some farmers acquire capital to make storage investments.

Supply-side subsidies – i.e., covering part of the production, marketing, and demonstration costs of seed storage manufacturers or seed storage technology vendors – were also used in all of the project case studies. It is difficult to say at what point a supply-side subsidy actually undermines market development for the technology or whether the subsidy should be built into production, marketing, and demonstration costs of the producer/vendor, or whether the subsidy should be applied to buyers (via voucher, for example). Yet all these issues and options present important considerations for practitioners in program design. Internal savings and lending schemes can also be implemented to address potential capital constraints for entrepreneurs in the storage business (as producers or suppliers of storage technologies).

Key message

- Direct subsidies are targeted at consumers through vouchers and/or targeted at manufacturers to help reduce costs of production, marketing or demonstrations. Subsidies can significantly help technology promotion and adoption in the near term, but an abuse of or dependence on subsidies will damage the potential for long-term viability.

Collaborating pluralistically – developing healthy and effective public and private partnerships

Pluralistic agricultural advisory services refer to the emergence of a variety of service providers, formed as a result of public–private partnerships such as through contracts to the private sector partner and non-governmental organizations (NGOs). Creating synergies among a variety of agencies and actors involved in agricultural development has come to the forefront as technology promotion becomes more linked to values such as decentralization, cost recovery, and commercialization.

Pluralism, in principle, may overcome constraints in funding and expertise. However, in practice, pluralism requires not simply common interests and sharing of knowledge, but practical inter-agency coordination. Initial areas of action which need to be coordinated are outlined in Table 4. To function pluralistically and leverage the resources of other actors, it is necessary to have a basic understanding of the wider systems in which agricultural knowledge and innovations are generated, disseminated, and adopted by farmers. Based on this wider understanding, points of synergy with particular seed storage technologies can be identified and these leverage points can be built into project design.

Table 4: Framework for assessing pluralistic collaboration with on-farm seed storage technology

Central Element	Key Question
Resources	Have practical procedures for planning, priority setting, and coordination with a variety of agricultural service providers been defined?
Information	To what extent have the benefits of the storage technologies been communicated with the diverse stakeholders / agricultural service providers?
Decision-Making	To what extent is the technology and program intervention an iterative process, that is, flexible and responsive to emerging needs and opportunities?
Delivery Mechanisms	To what extent does the technology and program intervention focus on more generalized asset production and transfer versus context-specific knowledge provision?
Accountability	To what extent is the technology and its promoters accountable to farmers and how can this accountability be strengthened?

Key message

- Pluralistic collaboration through public-private partnerships can be an advantageous way to promote farm technologies. However, synergies and leverage points must be explicitly identified in project design.

This brief has reviewed in considerable detail the processes for calculating costs and returns of seed and grain storage technology. It has also focused on the varied and pluralistic mechanisms for promoting seed storage widely among farmers. In both themes, the main message is clear. Farmers need transparent and comprehensible information in order to make rational adoption decisions. Use of a storage technology goes well beyond its technical effectiveness. Farmers need to know if the technology will pay off – in the short and long term – and eventually without subsidy.

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Appendix 1: Brief 3 – Storage Technology Financial Analysis Table Template for Microsoft Excel

The worksheet below presents in greater detail a framework for comparing costs and returns of using one storage product or another. The template suggested has been designed for use with Microsoft Excel.

	A	B	C	D	E
1		Sell at Harvest	Storage Product A	Storage Product B	Explanation of Formula
2	Harvest (kg)				enter as parameter for each technology
3	Months stored	–			enter as parameter for each technology
4	Dry weight losses (%)	–			enter as parameter for each technology; weight loss in grain from beginning to end of storage period
5	Quantity marketed (kg)	=B2	=C2*(1-C4)	=D2*(1-D4)	calculates remaining grain weight left after dry weight losses
6	Price at harvest ($/kg)				enter as parameter for selling at harvest
7	Commodity price for clean, undamaged grain after storage period ($/kg)				enter as parameter at point of time after each technology's storage period; meant to compare price for top quality grain with price of lower quality (damaged) grain
8	Total price discount for grain damage present (compared to clean grain) (%)	–			enter as parameter for each technology; if top quality grain is $0.20/kg and the Storage Tech. A grain sample is valued at $0.18/kg, then enter «10%» discount; if same price is the same as top quality grain then simply enter «0%»
9	Final price received after storage ($/kg)		=C7*(1-C8)	=D7*(1-D8)	calculates technology grain sample price with discount applied; redundant if final price known with certainty, but useful when only a known discount formula is available to estimate (ex. Compton et al. (1998) estimates a 0.75% price discount for every 1% grain damage in Ghanaian maize)
10	Commodity revenue ($)	=B5*B6	=C5*C9	=D5*D9	calculates final grain weight times final grain price (Revenue = Price x Quantity)
11	Total technology cost (for total quantity stored for entire storage period) ($)	–			enter parameter for each technology, depreciated for storage period
12	Rate of OCC (ex. 25% or 50%)	–			enter parameter for each population; see text explanation; could represent the annual interest rate on a loan in that area or expected percent annual gain from investment in other activities like livestock
13	Total OCC Adjustment ($)	–	=C12*(C3/12)*(B10+C11)	=D12*(D3/12)*(B10+D11)	calculates the adjustment necessary to incorporate the time value of money invested by purchasing storage technology and the grain value of harvest (and not investing that money somewhere else during the harvest months)
14	Economic return on storage ($)	–	=C10-B10-C11-C13	=D10-B10-D11-D13	calculates the net economic gain the farmer receives, after costs and adjusting for the time value of money
15	Economic return on storage (%)	–	=C14/(B10+C11)	=D14/(B10+D11)	calculates the percent gain (return) on the storage investment

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