

Water Purification In Slaughterhouses In Nepal

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Section 103 Monday 8:30am

AGR 1110

Monday, November 24, 2014

Part 1: Production Information

Product Description:

The Crown Berkey water purifier comes from Conscious Water, a Canadian distributor of Berkey gravity water purifiers. It was designed after the events of 9/11, to help provide quick clean water in emergency situations for large numbers of people. It can hold enough water for 40-150 people which is equivalent to six gallons of purified water at a time (Berkey, 2014). Berkey products are used worldwide by relief programs like UNICEF and the Red Cross in distressed countries to help provide clean, purified water where there may be chemicals or pathogens in the water (Berkey, 2014). Conscious Water is ran out of Collingwood Ontario, and is run from a home office and an off-site warehouse (Berkey, 2014). The founder of the company used to be a canoe guide and on a trip another guide told the group the importance of the water around them, which made him realize that the water people take in is extremely important for the health and to reach full potential (Berkey, 2014). He started to purify water for clients on canoe trips which led him to become an official distributor of Berkey products in Canada (Berkey, 2014).

The Crown Berkey originates from the design of John Doulton's ceramic filtration system for Queen Victoria (Berkey, 2014). The system has changed miraculously since 1835, with the first change coming to it in 1862 by John's son Henry, when bacteria was discovered (Berkey, 2014). Henry Doulton was knighted by King Edward VII, who allowed his company to use "Royal" in reference to its products (Berkey, 2014). He continued to make changes to the Berkey as it became more popular, causing one to be named "The Crown Berkey" (Berkey, 2014). There are seven different types of large Berkey water purifiers along with a water bottle, with the Crown Berkey being capable of serving the largest number of people (Berkey, 2014).*

The way the Crown Berkey's works is that water is poured into the upper chamber of the Berkey where gravity brings the water through the purification elements (Pantry Paratus, 2014). Contaminates are captured in the purifiers and within the water are small absorptive elements that are separated from the water (Pantry Paratus, 2014). The now purified water stays in the lower chamber where it can stay until needed and can be brought through the spout, or left to sit until needed (Pantry Paratus, 2014). The Berkey needs water pressure to work at its full potential (Pantry Paratus, 2014). It is intended to remain stationary when filled (Pantry Paratus, 2014). The filters can be cleaned and be used over again for up to 5 years (Berkey, 2014).**

*Refer to figure 1 in the appendix for diagram of Henry Doulton's original design of the Berkey.

**Refer to figure 2 in the appendix for picture of the Crown Berkey.

Health and Nutritional Information Associated:

Polluted water can cause the meat to become infected with microorganisms that are harmful for consumers (Food and Environment, 2012). There are no proper safety precautions are taken when using the polluted water of Nepal, the polluted water itself is used when cleaning slaughterhouses and on the meat, causing there to be a severe risk to human health (Jimba, 2001). There are many different ways to remove bacteria and contaminants like; boiling water to kill bacteria, filtration, disinfection with iodine, chlorine, or chlorine dioxide, although they may not be 100% effective at times (Centers for Disease Control and Prevention, 2009).

The Berkey would be used in slaughterhouses to help provide clean, purified water where there may be chemicals or pathogens in the water. It would help prevent the contamination of meat when it is being cleaned and would be used to help with the whole sanitization of the slaughterhouses. Using clean water on the meat would prevent the spread, and causes of

Bacterial pathogens like Salmonella and E. coli to Viral pathogens like Hepatitis and Norwalk virus, to Protozoan parasites and chemical contamination from environmental contamination, in humans (Canadian Food Inspection Agency, 2013).

Adaptations required:

The Berkey is intended to remain stationary when filled, so the spout would need to be adapted for a hose connection for easier use and manoeuvring in slaughterhouses. To keep water pressure constant, there would need to be another adaptation for it to intake water through a tap or hose connection. With an intake connection, it would ensure that there is constantly water flowing into it and that there is constantly purified water.*

*Refer to figure 3 in the appendix to an example hose connector elbow.

Market Opportunity:

The market opportunity for the Crown Berkey may not be big at first as most Nepalese haven't heard of the Berkey products before and won't know how they work. It would be an investment risk that most abattoir owners may not want to take unless they are given assistance from the government, or can see how the Berkey works before purchasing. Once the communities see how well the Berkey works sales should increase, and more people will have safe meat and drinking water.

Benefits to Canada:

With the Crown Berkey water purifier being exported from Canada to Nepalese slaughterhouses, it would create undoubtedly needed Canadian jobs with the Canadian Unemployment rate for October 2014 being 6.5% (Statistics Canada, 2014). The jobs it would

create would be in the large manufacturing warehouses, along with jobs when shipping it to Nepal. There would also be two jobs created for Canadians to go to Nepal, one being a sales representative to sell the Crown Berkey system to the abattoirs and the second representative would be in Nepal to help the customers properly apply for loans and grants from the Nepalese government. The Canadian representatives would also help the locals start up a retail store based out of Kathmandu area.

Part 2: Export Potential to Nepal

Nepal:

Nepal is landlocked by China and India in the Asian continent, it is home to the largest altitude changes, from land at sea level to the tallest mountain in the world; Mount Everest (National Geographic, n.d.). The government of Nepal functions as a federal democratic republic, with a political system of multiple parties, and is similar to Canada with many different levels of government (Global Edge, n.d.). There is current Prime Minister is Sushil Koirala, along with Sushil there is also the President Ram Baran Yadav (Global Edge, n.d.).

There are three geographical and ecological levels of land in Nepal that consist of many different types of regions (Naturally Nepal, n.d.). These regions include the lowlands (Terai plains), the midland (Hilly) and the highland (Himalayans) and run from east to west, with river water flowing vertically (Naturally Nepal, n.d.)*. The majority of the land area is the hilly region, with highlands and lowlands almost being equal to each other (Nations Online, n.d.). With the land being mountainous there are a lot of terraces to help stop erosion, while the Terai plains flood seasonally (Raja Khanal, personal communication, October 3, 2014).

80% of Nepal is classified as a rural country, with the GDP being 30% in Agriculture (Raja Khanal, personal communication, October 3, 2014). The farming done in Nepal is subsistence farming, instead of commercial farming like in Canada, meaning there are many crops year round on a single piece of land throughout the year to provide for the family (Raja Khanal, personal communication, October 3, 2014). The crops that are grown are grown from the previous year's seeds (Raja Khanal, personal communication, October 3, 2014). Mustard, maize, wheat and wet rice are the most commonly grown crops (Schroeder, 1985).

Hinduism and Buddhism are both practiced, while Hinduism is more commonly practiced, although there is no longer a caste system in place, as it was prohibited by the government (Raja Khanal, personal communication, October 3, 2014). The Hindu's worship their cows as if they are god and the cow's are never culled for the purpose of food, they are left to live out their life once they are done producing (Raja Khanal, personal communication, October 3, 2014). Poultry, goat, buffalo and dairy farming are key livestock farming, the milk is collected from the goat, and cow, it is saved for the household, while some is sent to the city for sale's and pork is raised for meat (Raja Khanal, personal communication, October 3, 2014). Buffalo and poultry are multi-purpose animals, both are raised for meat, while the poultry is also raised for egg production, and the buffalo for milk (Raja Khanal, personal communication, October 3, 2014). Very few family's can afford to eat meat, so they eat lots of vegetables, rice and soups for meals (Raja Khanal, personal communication, October 3, 2014).

Although they may not slaughter their cattle, they do kill their buffalo, pork and poultry in polluted slaughtering locations, such as river banks and open roads, and use unhygienic and polluted water to clean the meat (Jimba, 2001)**. Meat and contents of the animals are found on the floors of abattoirs, where they can come in contact with bacterial pathogens, viral pathogens,

protozoan parasites and chemical contaminants and become infected (Jimba, 2001). With almost half the one hundred eleven surveyed slaughter houses in Kathmandu, Lalitpur and Bhaktapur area being in terrible condition and very unhygienic, it increases the chances of meat becoming infected and making people sick (Jimba 2001). Although the Nepal Veterinary Council set a goal to set up slaughter houses throughout Nepal and to set up training programs on hygienic slaughtering practices both by 2003, the Nepalese government has not prioritized it due to the lack of health and agriculture studies within the country (Jimba, 2001).

*Refer to figure 4 in the appendix to see land divisions of Nepal.

**Refer to figure 5 in the appendix to view how cleaning of chickens is done.

Transportation:

The Crown Berkey would be shipped from Conscious Waters warehouse on a truck or train to either Toronto and be sent via boat to New Delhi, India. From New Delhi the Berkey will be shipped to Kathmandu Metropolitan City by truck.* From the city it would be distributed to places in need, like a Berkey retail store if one is opened up. If sent individually the Berkey's can be sent from Conscious Waters warehouse using Canada Post via International Parcel- Air or International Parcel- Surface. Being shipped individually by Canada Post would be more expensive in the long run but takes less time, whereas being shipped by a boat would be a lot cheaper in the long run for the amount of Berkey's that fit on pallets but it would take longer to get to Nepal.**

* Refer to figure 6 in the appendix to view the mapped route for shipping.

** Refer to figure 7 in the appendix to view a mapped out route from New Delhi to Kathmandu.

Benefits to Nepal:

Importing the water purifiers to Nepal would benefit slaughterhouses because it would purify the water being used to clean the facility and on the carcasses. It would show the Nepalese the importance of safe and clean water being used on fresh meats during the butchering process. Importing the purifier would lower the risk of disease and infection transmission, and has potential to change the health of the country as a whole. It would also create jobs in Nepal and if a retail store were to open up in the city of Kathmandu area, there would be sales people in the store, and there would also need to be a representative from Nepal to go along with the Canadian representatives to connect with the locals and help out in selling the product.

As the city of Kathmandu is currently starting to build a new abattoir 19 kilometres from the city, that abattoir will be in need of a three to four Crown Berkey's to have a good amount of purified water for sanitation (Karoobar, 2014). According to Karoobar Economic Daily there are already 60 slaughterhouses in the Kathmandu Valley area, the majority of which are unhygienic and would each need at least one to two Berkey's as their slaughterhouses are small scale and do not process a large enough amount of animals on a daily basis to require any more purifiers (Karoobar, 2014).

Cost:

To purchase the Crown Berkey it would cost roughly \$349.00 with two filters or \$448.00 for four filters, you can get it with up to eight filters but due to the cost it would be unfeasible for the Nepalese (Berkey 2014).* The cost of the adaptations are unknown but wouldn't cost more than \$100.**

Shipping individually would cost \$141.21- \$280.91 via Canada post (Canada Post, 2014). The cost to send twenty Crown Berkey's from Toronto using A1 Freight forwarding via pallets and crates on a boat to New Dehli, India is roughly \$292.20 USD. The product would need to be driven from New Delhi to Kathmandu by either UPS or FedEx, it would be a 17 hour and 39 minute drive, the cost for that trucking is unknown. To send twenty Berkey's via airfreight to Kathmandu from Toronto is \$560.00 USD. The upfront cost of the Berkey would have to be inflated to cover the cost of shipping it to Nepal, but with the cost of shipping twenty Berkey's via A1 Freight Forwarding being so low it would reduce cost to send them to Nepal via boat rather than Air, which would reduce the cost the buyers would have to pay for their product.

According to Raja Khanal one Canadian dollar is roughly worth \$90 Nepalese Rupee (Raja Khanal, personal communication, October 3, 2014). For the cost of the Crown Berkey it would be very beneficial for the locals although costly, since the Kathmandu area is building a new abattoir and the possibility of the unhygienic abattoirs being shut down, they wouldn't be in need of the Crown Berkey, only the new abattoir and the old ones that do stay open.

Shipment Method	Number of Berkey's Being sent	Cost	Starting	Middle Destination	Final Destination
Canada Post	1	\$141.21- \$280.91CND	Collingwood, Ontario	N/A	Kathmandu
A1 Freight Forwarding via Boat	20	\$292.20 USD	Vancouver, British Columbia	New Delhi	Kathmandu
A1 Freight Forwarding via Airfreight	20	\$560.00 USD	Toronto, Ontario	N/A	Kathmandu

* All cost done in Canadian dollars unless indicated otherwise.

** Refer to Table 1 in the Appendix for the broken down cost of The Crown Berkey.

Loans/Grants:

The costs of the Berkey's could possibly be funded as loans or grants from the Nepalese government to the owners of the slaughterhouses, as the cost of one Berkey would cost too much for the slaughter houses and may force them to shut down, but if the government were to work with the slaughter houses it would cut cost, and make it more beneficial for the operators and consumers.

Marketing Strategy:

The Crown Berkey will be marketed to the owners of the abattoirs throughout Nepal, with the majority being in the Kathmandu Valley area. The Crown Berkey is an investment risk the Nepalese sense they don't know how the Berkey works. A Canadian and Nepalese representatives would work together to market the Berkey's, they would go abattoir to abattoir trying to sell the product. The Nepalese sales representative would be there to talk to the client in their first language of Nepali, and would help with the language barriers. The Canadian representative would be there to convince the client and talk about the fine details. If it is seen that there is enough sales for the Crown Berkey, or any Berkey in particular a small retail store would be opened in the Kathmandu area with a small but wide variety of Berkey's for sale.

Competition:

The main Canadian competitors for the Crown Berkey water purifier would be the Santevia purifier, Aquasana, Brita and Propur, all of which compare really well to the Berkey although they do not purify all viruses and bacteria like the Crown Berkey does (Berkey, 2014). The reason to choose the Crown Berkey is because it purifies the most water the quickest and the filter life span is typically twice as long as any leading competitor (Berkey, 2014). The Crown

Berkey also competes very similarly to the American version of the Berkey as it has the same specifications and productivity. *

*Refer to Table 2 in the appendix for a comparison of the Crown Berkey with competitors

Future Studies Required and Unknowns

Labour cost for employees to work in the manufacturing warehouses, the cost the representatives are all unknown at the present time, it would need to be looked at in the future to determine the sales cost of the Crown Berkey. The cost of shipping and transporter for the Berkey to go from Collingwood to Toronto, and New Delhi to Kathmandu is unknown, and would need to be looked at as well before it can be shipped over to Kathmandu. Possible Canadian and Nepalese loans and grants would need to be found to help reduce shipping cost and/or sales cost.

Recommendations:

Although the Crown Berkey is being sent to Nepal with the purpose of being used in slaughterhouses, it can also be sent for the use in communities that do not have good drinking water. It can also be sent to hospitals to help provide clean drinking water. Furthermore, the Crown Berkey can also be sent to Nepal for relief groups to use. With there being many different sizes of the Berkey to serve for different purposes, smaller sizes may want to be sent to Nepal for the use of supplying water in polluted and contaminated areas. The Crown Berkey may only be sent to Nepal in the Kathmandu area to see how efficient they are before committing to more for the abattoirs and city.

Appendix

Product Description:

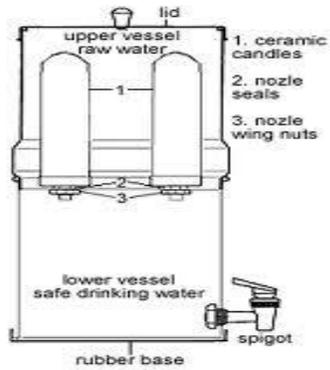


Figure 1: The original design of Henry Doulton's Berkey.

<http://www.consciouswater.ca/gravity-water-filter>



Figure 2: The new and improved Crown Berkey.

<http://www.consciouswater.ca/gravity-water-filter>

Adaptations:



Figure 3: Possible style of a hose connector, for adaptation to be done to the Berkey.

http://www.metals-b2b.com/b2b/iron_and_steel/3/brass_hose_connector_124.htm

Nepal



Figure 4: (Figure 4) Land Divisions of Nepal

<http://www.highlandsherpatrek.com/nepal/information/geography-of-nepal.html>



Figure 5: Processing of chicken in the streets of Nepal.

<http://leahrolson.wordpress.com/category/nepal/page/2/>

Transportation:



Figure 6: Mapped out shipping route from Collingwood Ontario, to Nepal.

<https://www.google.ca/maps/dir/Kathmandu,+Nepal/Collingwood,+ON/@29.9308042,->

15.4178996,2z/data=!4m13!4m12!1m5!1m1!1s0x39eb198a307baabf:0xb5137c1bf18db1ea!2m2!1d85.333333!2d27.7!1m5!1m1!1s0x

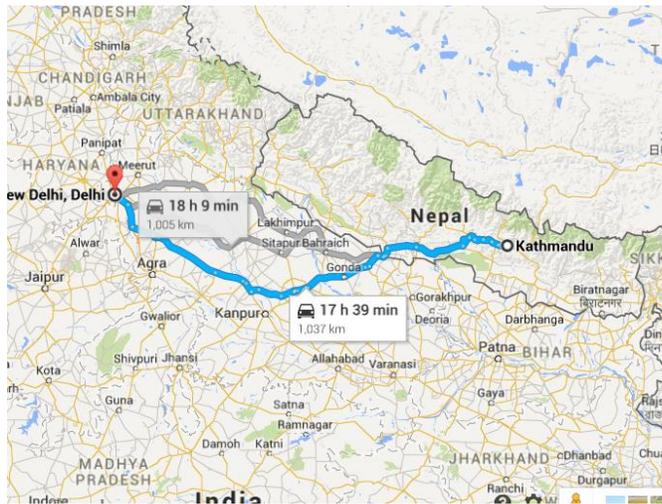


Figure 7: Mapped out route from New Delhi to Kathmandu.

<https://www.google.ca/maps/dir/Kathmandu,+Nepal/New+Delhi,+Delhi,+India/@27.7333957,76.535625,6z/data=!3m1!4m1!4m13!4m12!1m5!1m1!1s0x39eb198a307baabf:0xb5137c1bf18db1ea!2m2!1d85.333333!2d27.7!1m5!1m1!1s0x39>

Cost:

	Canada Post (1 Berkey)	A1 Freight Forwarding By Boat (20 Berkey's)	A1 Freight Forwarding By AirFreight (20 Berkey's)
Cost	\$349.00-\$448.00	\$349.00-\$448.00	\$349.00-\$448.00
Shipping	\$121.21-280.91	\$14.61	\$28.00
Adaptations	\$100.00	\$100.00	\$100.00
Rough Cost per Berkey	\$570.21-\$828.91	\$463.61-\$562.61	\$477.00-\$576.00

Table 1: Individual breakdown for each Berkey

Competition:

	Crown Berkey	Santevia	Aquasana	Brita	ProPur
Virus Removal	Yes	No	No	No	No
Base Cost	\$349.00	\$200.00	\$124.99	\$18.99	\$239
Max Hourly output (gal/hour) Base	6.5	1	Unknown	1	9
Max Cost	\$646.00	\$200.00	\$124.99	\$18.99	\$338.00
Max Hourly output (gal/hour)	26	2	Unknown	2	18.5

Table 2: Comparison of the Crown Berkey with competitors <https://www.consciouswater.ca/berkey-water-purifier/>

Recommendations:



Figure 8: Comparison of all the Berkey's that could be sent to Nepal for other uses. <http://www.consciouswater.ca/berkey-water-purifier/>

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