INDIVIDUALS' PERCEPTION & THE POTENTIAL OF URINE AS A FERTILIZER IN ETHEKWINI, SOUTH AFRICA.

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ABSTRACT

Climate change, environmental degradation and unsustainable consumption of resources are increasingly putting a strain on the Earth's natural wealth. More sustainable sanitation behaviour such as using wholly UDDT (urine diverting dry toilets) can help alleviate the strain on water resources. Urine could be used as a fertilizer as it contains nitrogen and phosphorus. Furthermore, with urine as a fertilizer, it would now be free, accessible to all and decrease our need to mine phosphate. This paper explores the perceptions and knowledge of farmers in the eThekwini municipality about urine and its use in agriculture. It seeks to understand if this practice would socially acceptable in order to contribute to the debate of food security. To investigate the attitudes towards urine, interviews were conducted with farmers who consult with the UmBumbulu Agri-Hub and at the Newlands Mashu Permaculture Learning Centre (NMPLC). These interviews were done in order to find out their views of urine and its possibility on integrating ecological sanitation, more specifically urine reuse in their programmes. Preliminary results illustrate that individuals' self-perception, that of others and non-motivational factors such as smell and lack of training remain as barriers to usage as well as lack of knowledge about its potential for fertilizing capabilities. In Zulu culture urine seems to be utilised in various ways and is deemed acceptable for medicinal or spiritual purposes. Nonetheless, there seems to be a negative perception of urine amongst most respondents. Even so, many farmers expressed curiosity towards the use of urine in agriculture.

Keywords: FERTILIZER, PERCEPTION, PLANNED BEHAVIOR, URINE REUSE.

INTRODUCTION

Sanitation remains a pressing issue across the world. It is estimated that in 2002, 2.6 billion individuals did not have access to improved sanitation (WHO & UNICEF 2005). In 2004 it was estimated that approximately 18 million South Africans, mostly in rural areas, did not have adequate sanitation (Republic of South Africa 2004). However, considering Earth's finite resources such as potable water, adequate sanitation may have to be redefined in order to utilise water sustainably. It would not be sustainable to provide flush toilets to all 18 million South Africans. Many areas in South Africa, which has non-renewable groundwater reserves, are already experiencing seasonal water shortages. In the long run, using potable water to flush human waste down the drain is unsustainable no matter where in the world, even in water rich countries such as Canada (FAO 2003). Thus, alternative technologies must be used in order to cut down on water consumption. The aim of this research is to understand the perceptions and knowledge farmers about using fertilizer in the form of urine for agriculture. It is also seeks to determine if this practice would be socially acceptable and possibly incorporating urine re-use as one of the methods in the trainings provided by the organisations to the farmers, in order to contribute to the debate on the potential of food security. A literature review will provide a brief overview of the history of urine uses, the concept of ecological sanitation (EcoSan) and South African perceptions of urine. The methodology used to conduct the research, results and discussions of the findings will follow

LITERATURE REVIEW

The Urine Market through History

Throughout history, humans have adopted human waste (urine and faeces) for medical (for diagnosis and therapeutic purposes), cleansing, aesthetic and agricultural purposes, without any signs of repulsiveness (Smith 1954; Drangert 1998). One of the present uses of urine for diagnosing certain diseases such as diabetes dates back millennia. Urine was utilised for diagnostic purposes in Ancient Egypt, Sumer and Babylon (Smith 1954).

In many areas urine was used intimately. It was believed to soften skin (Smith 1954). It was used to treat various skin ailments and urine was also incorporated into special drinks for medicinal purposes (Drangert 1998; Sawyer 2003). Greek and Roman civilisations and later on in France and Denmark used urine as a cleaner and detergent (van Vuuren 2008; Jewitt 2011). Urine was also used to dye clothing, soften wool, help in the tanning of animal hides and even in the manufacturing of gunpowder (Esrey et al. 2001; Höglund 2001; Jewitt 2011). Other products which make use of urine in part of their production process include: Harris Tweed, tobacco and cheese (Smith 1954).

Historically, individuals were in charge of the disposal of their personal household waste. However, as population density increased sewage and sanitation logistics were put in place (Bracken et al. 2007). In the span of 30 years, from 1867, Durban's sewage went from the collection, manufacturing and selling of night soil for agricultural purposes to water sewage system. The transition was partly due to mounting apprehension of disease in a growing and denser urban environment (Kearney 2012). Night soil collection was done a few times a week, with carts going from street to street taking it out of sight.

> A population of 3 000 produced 200 full pails which arrived daily at the depot each weighing 31 lbs, totalling 891 tons per year. [Excluding] the slopwater, the valuable part is 700 tons, made up of 75 tons of solid faeces giving 20 tons of solid; 25 tons of paper and 600 tons of urine all providing 85 tons of valuable fertiliser, each pail takes 50 lb absorbent ... a total of 1 397 per annum (Kearney 2012, 62).

Night soil collection continued up to 1936 in the Umbilo and Umgeni areas (Kearney 2012). For centuries human waste has been used for different purposes. Therefore, it should not seem foreign for Durban residents to make use of humanure as it was used for years in the city. Yet, it appears that matters of bodily waste have been conveniently, flushed away and easily forgotten.

Ecological Sanitation (EcoSan)

The success of disposing of our human excrement out of sight and out of mind has created the idea that once it is out of sight, the waste is no longer an issue. The transformation from urine-blindness (a negative view of urine) to an acceptance of urine as a resource is a difficult battle. Efforts are being made to deter the use of the chemical and technically complex sanitation systems that incurs financial and environmental cost to processes that are more environmentally sustainable and still provide a hygienic, clean and dignified manner in which of disposing of excrement (Drangert 1998; Duncker et al. 2007). To flush away the problem seems to be the solution that people strive for, though not the most sustainable. The world over and in particular, water-stressed regions individuals and governments are looking to alternatives to decrease water consumption and potentially recycle some of the beneficial nutrients found in urine and faeces (Drangert 1998).

Many sanitation systems have been developed for households who have yet to have access to perceived modern or dignified sanitation. They have been created to suit different physical environments, gender and cultural preferences. LDC have been a prime focus in developing ecological sanitation (EcoSan) systems or Closed Looped systems such as the urine diversion toilets (UDT) (Morgan 2004). EcoSan is an ecosystem approach where urine and faeces are seen as resources not as waste to be disposed of. Both urine and faeces contain nutrients which can be recycled back into the earth. As a result, it would have beneficial impacts on food production and security.

These alternative technologies may have multiple benefits, yet, as with any new technology, individuals are not always very receptive to innovations (Rogers 2010). One must understand people's perceptions in order to possibly predict the reaction to new concepts. Individuals' perception on urine is important to understand. In order to seek to help expose people to seeing urine from a different perspective and possibly use it in agriculture.

Where does South African perception fit?

South Africa as a nation is food secure, though 14 million inhabitants are at risk of food insecurity. In relation to agriculture, access to fertile land and fertilizer hinder the possibility of being food secure (WRC 2007; Wilkinson et al. 2010). Food security defined in the South African context refers to availability, access and utilisation of nutritious, safe, sufficient quantities in order for all to achieve their dietary needs and a healthy life (Wilkinson et al. 2010). Manners in which food insecurity is dealt with in South Africa included food fortification programmes, nutrition education and promoting the production of one's own food supply through food garden (Wilkinson et al. 2010). Access to fertilizers remains a challenge for many and the increase price of chemical fertilizers in the past five years have made it more difficult for farmers. The incorporation of urine in agriculture could increase production, access and sell extra food produced (Wilkinson et al. 2010).

In most areas of the country, urine diverting dry toilets (UDDT) have not been wholly accepted. For example in Kanniesberg, out of almost one thousand households using the UDDT system only 50 were reusing the urine and faeces in agriculture (Jackson 2005). In Mthatha, Eastern Cape is one of the areas where there was a high rate of human waste reuse. The community had wholly accepted the UDDT. They had received extensive training and support on ecological sanitation. Though, the respondents still utilised urine with specifications. They did not for root or leafy vegetables or any vegetables that have contact with the ground (van Vuuren 2008). In most other areas of the country, ecological sanitation has not been widely accepted (Duncker et al. 2007). According to a survey conducted in eThekwini, when asked about urine in agriculture, 41.8 percent of respondents thought that urine kills plants, 14.8 percent thought it kills insect, only 9.7 percent thought it would help plants to grow and 4 percent believed it would pollute the soil (Okem et.al. 2012).

The idea of reusing human waste in agriculture is still very foreign. Generally, "food and human waste should not be uttered in the same breath" (van Vuuren 2008, 30). Few do have some knowledge of the potential of faeces, yet not the fertilizing potential of urine (Drangert et al. 2002; Duncker et al. 2007). Human faeces are what resemble most manure which is generally more accepted whereas the use of a liquid fertilizer, urine which has a very potent smell, is unknown. In the case of Kimberley, when the UDT were built, the households were not informed about the fertilizing potential of urine, but only of faeces (Drangert et al. 2002). The reasoning for the hesitation behind the use of urine is that urine will burn plants, it is unhygienic, smelly and individuals' have never heard of it being used (Drangert et al. 2002; Duncker et al. 2007; van Vuuren 2008). The main concerns among the respondents in various communities in eThekwini were health, smell, the perception of others while religious and use for magic were the least important of concerns (Okem et al., 2012).

Even prior to using human waste in agriculture, the mere fact of handling human waste instils fear in many individuals, which may be the result of health and hygiene campaigns promoting hand washing after using the sanitation facilities (Duncker et al. 2007; van Vuuren 2008). Many worry that handling or inhalation of human waste will cause sickness and potentially contract HIV/AIDS (Drangert et al. 2002; Duncker 2006; van Vuuren 2008). Although not used in agriculture urine has quite many uses in South Africa as part of traditional medicine. An infant's urine can be used to treat eye infections, treat burns, get rid of spots on skin, help relieve swollen ankles and feet, to treat snake bites to get rid of the poison, protect from bad luck and witchcraft and even help children start walking (Drangert et al. 2002; Duncker et al. 2007; van Vuuren 2008). However, these uses are not known by all in the community. According to Okem et al. (2012) almost 50 percent knew of no purpose of urine, while approximately 27 percent were aware of medical purposes,

5.5 percent for ritual purposes and only 3.6 percent knew that urine could be used as a fertilizer. South Africa seems to be an ambivalent country in relation to EcoSan.

METHOD

Theoretical Framework

In order to understand the type of behaviour individuals' would have towards the use of urine in agriculture Ajzen's (1991) Theory of Planner Behavior l will be used. This framework is utilised to understand as well as possibly predict the behaviours of those individuals.

Ajzen's Theory of Planned Behaviour "is the individual's intention to perform a given behavior" (Ajzen 1991, 181). The theory looks at what are the factors that may affect the possibility of an action being taken. The ability to perform such behaviour will depend on the availability to perform such actions, cooperation with others to do so, time, finances and skills. Moreover, referring to Figure 1., the motivation and intention in performing that said behaviour will be reflected by (1) attitude, if one own self perception of the behaviour is favourable or not, (2) subjective norm, the perception of others and social pressure to perform the behaviour or not and finally (3) the perceived behaviour control which refers to the level of difficulty in performing said behaviour.

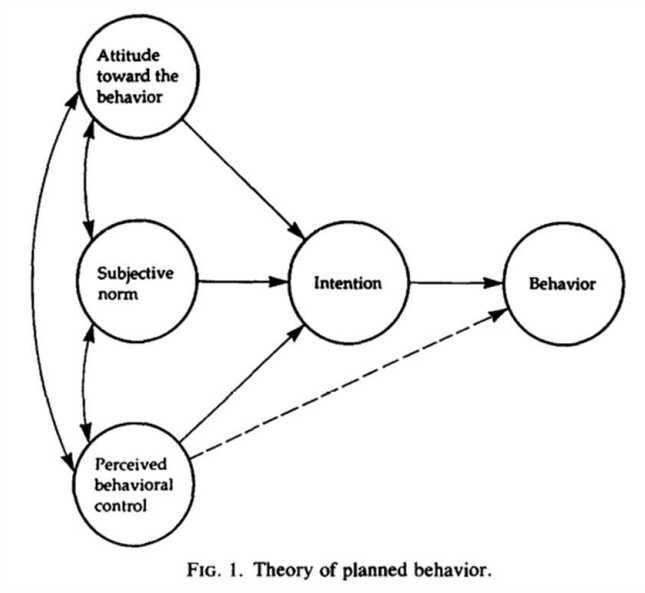

Figure 1. Diagram of Ajzen's Theory of Planned Behavior (Ajzen 1991, 181).

Location and Process of Data Collection

Two locations were selected as case studies for this research. First is the Newlands Mashu Permaculture Learning Centre (NMPLC) which was started in 2000 as an NGO and is now run by the Agricultural Management Unit of the eThekwini municipality as one of its Agri-Hub training centres (E. Gori and Associates 2012). The NMPLC deals with farmers from all over eThekwini. However, for the purpose of this research members of two community gardens in Ntuzuma and Inanda were interviewed. Second is the Umbumbulu Agri-hub is a public-private partnership. It was started in September 2010 by the Newlands Mashu Community Development Foundation for the eThekwini municipality and its focus on supporting small-scale growers through permaculture principles (IMS - Infrastructure Management & Socio-Economic Development Department 2011). The selection of two different areas allowed me to interview farmers from different communities in peri-urban context in Umbumbulu and in an urban, township context with the farmers who deal with the NMPLC.

The interviews were conducted from July to August 2012. The interviews ranged from 20 to 68 minutes in length. In Umbumbulu, the interviews were conducted directly at the home and gardens of the farmers. At the NMPLC, I attended farmers' meetings in Ntuzuma and Inanda which were on location in the community gardens. The interviews occurred during and after the farmers' coop meetings. Interviews were conducted with twelve farmers from the respective organisations.

Characteristics of Respondents

Table 1. Farmers Interviewed

Pseudonyme	Organisation	Age	Sex	Educational Background	Years or Experience as a farmer
Mr.G	Umbumbulu	70	M	Standard 9	9 years, no training
Ms.S	Umbumbulu	73	F	Teaching - University	46 years, training from nuns in Marian Hill
Mr.Z	Umbumbulu	61	M	Standard 9	Since he was born, training from mother & now the Agri-Hub
Mr.L	Umbumbulu	74	M	College	Gardening in primary (1949) & parents were farmers
Mr.M	Umbumbulu	30	M	National Diploma in Agriculture	Since he was young, his parents were farmers
Mr.C	NMPLC	57	M	Standard 6	Learnt gardening skills in primary school
Mr.I	NMPLC	59	M	Standard 9	Since he was young parents were farmers
Ms.T	NMPLC	36	F	Standard 5	Since her was young parents were farmers
Mr.Gw	NMPLC	45	M	Standard 8 but not finished	10 years & lots of training in permaculture
Ms.B	NMPLC	42	F	Grade 12	7 years, gardens at home & training from Dept. of Agriculture
Ms.Z	NMPLC	52	F	Standard 9 & finishing Standard 10	Since she was young, her parents were farmers
Ms.M	NMPLC	26	F	Matric & 1 year computer certificate	Gardening training at the library & gardens at home.

RESULTS

The results will present what present fertilizer farmers uses and the cultural uses of urine. Based on Ajzen's Planned Behavior framework, the results are structured according to the attitudes or perception of farmers about urine, the subjective norms which deals with the knowledge about urine and how respondents feel others perceive urine. Finally, the perceived behaviour controls which refer to more pragmatic aspects in dealing with urine and its feasibility in implementation.

Source of Fertilizer

For most respondents, manure is an important source of nutrients for their vegetables. Cow, chicken, goat and horse manure are significant inputs as soil conditioners. Interestingly, most of the farms are quite small and they did not own any animals. In Umbumbulu, most have developed a relationship of reciprocity with neighbours who own animals. They source manure from neighbours, free of cost.

In Ntuzuma and Inanda, the farmers are mostly reliant on the municipality for sourcing their soil conditioner. There is someone from the NMPLC who periodically comes to their garden and provides manure or sewage sludge. Initially, the farmers were quite reticent to using sludge, unknowing of its composition and adverse to the idea. Presently, most are creating their own compost from the sludge, mixing it with manure, their garden and kitchen scraps to create well-balanced compost. For now all farmers seem to have reliable sources of fertilizer, although they are not the owners of the animals who are producing a significant part of their fertilizing inputs.

Cultural Uses of Urine

Urine use is not a foreign concept in Durban among Zulus people, though two respondents are not aware of any uses for urine. Most respondents are aware of some traditional uses of urine especially for medicinal

and spiritual purposes. As a traditional medicine urine is used for various purposes. It is used to neutralise poison. It is a common treatment to treat pink eye and stomach ailments.

Spiritually, the most prevalent uses are:

- Spreading the urine from the night bucket around the home in order to protect from evil spirits.
- If there is something in one's backyard that seems suspicious, urine can be put on it in order to kill it.
- Urinating directly on plants, especially plants that have medicinal properties, the urine will take away the properties of those plants.
- Urine can be used to bring bad luck upon others.
- One can use their first urine in the morning to wipe their face in order to get rid of bad dreams.
- It can be used to keep partners close to you.
- Similarly, urine can be used to prevent an erection with a married woman, unless the lover drinks the woman's urine in order to break the spell.

Urine seems to be an integral part of traditional Zulu medicine. It has multiple uses and many of which have been tried, tested and proven efficient by several of the respondents.

Attitudes of Farmers: Perception of Urine

The attitude of individuals is important to understand in order to comprehend reactions and behaviour to urine reuse. One would think from the multiple uses and experiences relating to urine, that the respondents would have positive attitudes towards urine. However, there seems to be a range of attitudes towards urine.

Most respondents have diverging views of what urine represented to them. In the most part respondents have an overall negative view of urine in general. It is seen as something bad, dirty and smelly. It is a waste, something that has no use and just needs to be thrown away. However, there are respondents who had a more nuanced view of urine. Urine is seen as a natural process, something neutral that has to happen to our bodies in order to keep human balanced and healthy. There are some respondents who have a positive view of urine. Their confident views are in relation to their practical experiences with urine or knowledge of its multiple uses.

In present day South Africa, especially in Durban, the use of human waste for fertilizing purposes is little practiced and relatively unknown. Even those who are aware of its uses do not necessarily make use of it. Moreover, it seems like faeces are associated with having the beneficial components even though most nutrients are found in the urine.

Many of the respondents are not keen on the idea of using urine, especially when it comes to crops. The biggest fear seems to be that urine would stress and burn the plants. It would damage the vegetables and the soil. Some respondents would categorically refuse to use or consume urine fertilized crops.

Ms.T specifies that urine will probably kill the plants if urine is applied directly. However, she thinks that diluting the urine in water may decrease the likelihood of killing the plants. Similarly, Ms.J and Mr.L thinks that mixing the urine with the soil will make it potentially passable to use in agriculture. Most respondents do not have specifications on the type of plants that can be grown using urine. If it can be used at all, it should be good for all plants. However, a couple of respondents Ms.M and Mr.M, specify that if they are to use urine they will use urine from their household, not of others.

Similar to animal manure, Ms.Z believes that mixing urine and faeces in the soil will be acceptable. She already eats vegetables that have been grown with the contents of old pit latrines and she has never gotten sick. *"As long as it is manure I don't care where it comes from animal or human, it's just the same*" (Ms.S). Ms.T does not see any problem in using urine, as they are presently using sludge, there *"is no question about what it is that is being put into the soil"* (Ms.T), referring to the sanitary pads and toilets paper visible in the decomposing heap.

One of the worries in the literature in using UDT is its proper use system in order to prevent cross-contamination with faeces. However, there are some people who would consider menstrual blood as a type of contamination. Thus, it is important to understand individuals' perception of not only urine but urine that would also contain blood.

It is interesting to find there is a whole process in order for men to avoid dealing with menstrual blood in tradition Zulu culture. Most of the male responses stated strict avoidance of menstrual blood. There are some respondents who are more willing to accept that urine would contain menstrual blood if they are unable to see it. In Zulu culture men are not supposed to see it. However, in sewage sludge they are aware that menstrual blood is in it and there is obvious evidence of it. However, the fact that the blood comes in a different form which is undistinguishable makes it more acceptable. Women have more positive views of menstrual blood. They would not be affected by it. Blood is perceived be beneficial for the plants, just like blood meal.

Subjective Norms: Knowledge of Urine in Agriculture

To know that something is useful or not is important, however, one's perception often can cloud whether behaviour is put into practice. In the section above there is no consensus. Respondents seem to be divided among those who have a positive outlook on urine in agriculture and those who do not.

Among the respondents, six know of the beneficial properties of human waste through experience in the field, tasting some crops that they know have been grown with human excrement or stories they have heard. The six others knew nothing of the sort. It is just a waste, not to be utilised, although the benefits of urine specifically is unknown to most apart from for one respondent.

Ms.S recalls hearing about using human waste in Marrian Hill. Germans nuns told her about it. They used to empty the pit latrines when they were full and spread the contents on the fields. Similarly, Ms.Z did herself practice EcoSan although not urine specifically. Respondents from the Sesiphapheme community farm remember eating potatoes grown by inmates from a nearby prison. They consciously consumed potatoes were grown with human waste generated from the prison sanitation system. Mr.M is the most knowledgeable respondent concerning urine reuse in agriculture. He is aware of its nitrogen content and its specific agricultural use.

Perceived Concerns of the 'Other'

Even if an individual has a positive perception of urine and knowledge that urine is beneficial in agriculture, the person may still be hesitant to use it due to the perception of others'. This seems to be a prominent issue among respondents.

Mr.M is the prime example of a farmer who has a good perception of urine, knows multiple traditional uses as well as its benefit as a fertilizer. However, he will not even use his own urine in his garden. For him, it will have negative consequences due to his customers knowing the type inputs he uses in his field.

Many respondents state that if they are to use urine in their field, they will not tell their customers about it, for they are aware of the general public's aversion to human waste. Ms.Z argues that consumers will not need to know if there vegetables are grown with urine or not. Even now consumers in the most part do not know who, how and where their vegetables are grown.

During a dual interview, when asked if Ms.M would use urine in her garden she said: "*I would only use my family's urine, unless he or she is a visitor".* But then Ms.Z interjected and mentioned that she thought that Ms.M was not afraid of using someone else's urine per se. But the real issue is *"she's afraid of asking them: Please give me your urine"*. Then, Ms.M confirmed that is there was a process of someone collecting and distributing urine she would use it, as long as she was not involved in the process. However, if she were to use urine in her crops she would first start with her family.

Perceived Behaviour Control: Non-Motivational Factors

These issues relate to the ability to perform such action or behaviour. It goes beyond perception to more measurable factors that hinder or persuade an individual to pursue an action. In the following research, several reasons are brought up that would impede the practice of using urine in agriculture.

The first factor relates to smell and what humans especially adults consume that contribute to the smell and quality of the urine. It is believed that one's eating habits influences the quality of the urine. An infant's and animal's urine are held in higher regard than that of an adults, as a child is less likely to consume processed foods and alcohol. On issue of disease and hormones, people fear that there are pathogens such as sexually transmitted infections (STI) that will transfer from an individual's urine to the crops that would be fertilized with urine.

A few respondents do not see the practicality in using urine in their fields. They have sufficient 'free' access to fertilizers through their social networks. They know what to expect from their inputs whereas if they are to use urine, they will not know what the outputs will be because they lack the knowledge and experience. In order to gain the knowledge to use urine efficiently and put it into practice there needs to be some skills acquired. The lacunae referred to most often is the need to gain more information on the topic, then maybe using urine in agriculture to be feasible.

How to Make it Possible

The manner in which using urine could be made tangible according to most respondents would be workshops. The workshops would need to be targeted to the farmers. Farmers must learn about the science behind it, the benefits and potential risks. They are the ones' who must be first convinced and see if it is feasible.

People need to see it to believe it. Demonstration plots could be developed in order to provide a comparison. There needs to be information dissemination from farmers and then possibly to the community, in order for people to get used to the idea and have it diffuses to become mainstreamed. It needs to be a gradual process as most consumers *"cannot believe it. It is not easy to change their minds"* (Mr.I).

The youth are a source of new knowledge. They have the power to influence their parents and the future. Ms.J thought that children would have greater influence on their parents than other organisations that would come with similar ideas. Mr.G had an overall negative perception of urine and little knowledge about it uses. He dismissed the idea for himself. Yet, saw potential in the future generations. The youth are learning about new technologies everyday. So they should be the one's to adopt these new methods and ways of thinking about agriculture.

DISCUSSION

In Wilkinson et al. (2010) stated that fertilizer cost had increase and were in the most part inaccessible for most farmers. None of the farmers referred to a shortage of fertilizer. However, they did not rely on purchasing chemical fertilizers. All respondents with the help of their respective organisations have created their own compost with a mix of animal excreta, food scraps, grasses and such, none of the respondents had their own animals to source the manure from. In Umbumbulu, most relied on neighbours who owned animals while in the community farmers relied on municipality workers from NMPLC for manure or sludge which is one component of the compost heap. While these relationships/networks between farmers and neighbours or municipality are good social capital to have, they may not be sustainable. Many things could happen: neighbours stop raising animals, they no longer provide the manure for free, a disease hits the animals, the municipality no longer has in its mandate to distribute fertilizer, issues of transport or they start charging for it and so on.

There seems to be a divide between what the perception of the respondents and what they know about urine. This is particularly flagrant when asked about the properties of urine where about of dozen different

uses were mentioned. Yet, many of those same respondents believed that urine was something negative or a waste to be disposed of as was mentioned in van Vuuren (2008) were food and excrements should not be discussed along side each other.

Could it be in the context of urine in agriculture, relate to the type of relationship that would be developed with urine? In traditional uses, urine seems to be used seldomly for certain occasions only when necessary. Whereas, if it were to be utilised as a fertilizer in farmers fields than the relationship would be constant, the collection of urine would be done on a daily basis, the consumption of crops grown with urine as well. This may be a subconscious deterrent for respondents because of the sustained contact with something that is perceived as negative unless in extreme circumstances where the use of it is necessary.

Most respondents who had heard of human waste being used, in prison gardens, with the German sisters in Marrian Hill or Ms.Z herself who has used the contents of old pit latrines had more positive perceptions and may be less swayed by what others would think. Nonetheless, Mr.M, who had great knowledge and knew the benefits of urine, was greatly influenced by subjective norms. At a business level, he was concerned about growing his business and wanted to make sure he kept his customer base. He knew of the overall perceived disgust of the majority of the population towards human waste. Whereas a respondent from Ntuzuma was worried about what her community who think of her on a personal level, not that she was worried about the business aspect of it. People do worry about their position in their community and how they are perceived by others. Presently in the eThekwini area the idea of EcoSan is new and somewhat unheard of. Thus, if the idea is to gain any momentum there needs to be a community behind the idea.

While one's perception, experiences and what other think of the idea is influential in a decision making process, there are factors that relate to more pragmatic issues. Some of the factors that came up from the respondents were smell, disease, hormones, transport and storage. In the South African context, the issue of HIV/AIDS is real, although not explicitly stated by the respondents STIs and disease were made reference to just like the fear of handling human waste would enable an individual to contract HIV (Drangert et al. 2002; Duncker 2006; van Vuuren 2008).

The belief that we are what we eat seems to be reflected in one's perception of urine as well. Most of the traditional uses of urine required one to utilise the urine of a child, which is believed to be more pure, or one's own urine (Drangert et al. 2002; Duncker et al. 2007; van Vuuren 2008). The urine of a child is seen as purer as the child will not consume as much processed foods or alcohol as an adult. As you are what you eat, it is thus not much of an issue as if there are any impurities in your urine. You already had them in the first place so it will not affect an individual that much and one has more means of control over disease and nutrient content to a certain extent. Therefore, if one were to use the urine of another, there is a fear of what others may be consuming that would influence the quality of urine.

Everyone thought it could be made possible in one way or another. None of the respondent had fatalistic view even those most pessimistic. Everyone saw a glimmer of hope. Although to change people's way of thinking is a slow and arduous thing to do. It requires commitment and passion, to make it feasible and sustainable. In order to promote the idea of urine reuse, respondents referred to workshops, trainings, demonstrations for comparative purposes. This type of support was provided in Mthatha where the receptivity of urine has been high (van Vuuren 2008). A few respondents focused on the next generation. Encouraging the education of the youth as innovators but also as initiators in their own households whereby the children would bring in the new knowledge into their homes instead of experts from various governmental departments.

All these ideas which would help propagate the concept of EcoSan allows for a significant role for organisations such as the Umbumbulu Agri-Hub and the NMPLC. They already have provided know-how and technical skills to the farmers. They have had great impact in affecting the farmers' agricultural practices by introducing more ecologically friendly principles, so why not 'close-the-loop' totally?

CONCLUSION

In the case of South Africa, increase training and workshops on urine reuse could help transfer acceptance of urine as medicine to its utilisation for agricultural purposes. My hope from this research is to initiate further research in a more action based approach. Eventually a pilot project could be put in place to assess the impacts of using urine as a fertilizer on crops. I hope this work will be useful for facilitators to design a training guide and skill transfer to farmers that encompasses the attitudes, norms and cultural practices of the farmers in order to incorporate this knowledge in their daily routines.

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