

Acceptance of Human Feces-based Fertilizers in Fecophobic Ghana

Gerlinde Buit and Kees Jansen

Characterizations of Ghanaian societies as “fecophobic” suggest that the use of human feces, for example as an ingredient of organic fertilizer products, is not easily accepted by them. However, empirical evidence on this issue is lacking, despite extensive attention to the potential of feces for such purposes. This study examines perceptions of both human feces and fertilizers based thereon among fertilizer users around Accra. The findings show that although negative perceptions surround fresh human feces, dried or treated feces and their use as fertilizers are generally considered acceptable. Based on anthropological and other literature and empirical data, the study creates a framework for understanding human feces in this geographical context as symbols of personal moral badness. Seeing feces is intimidating; the more perceived feces resemble the beholder’s own feces, the more they remind him of his own badness. Dried or treated feces no longer visually intimidate the beholder and are therefore more neutral. There is no “contagion” of negative connotations between these different forms of feces. Changing the appearance of feces is both a physical and symbolic way to take away its “out-of-placeness,” in Douglas’ terms, and give it a new meaning as useful artifact instead of bodily secretion.

Key words: feces, fecophobia, technology acceptance, culturalism, naturalism

Introduction

Various parties in Ghana show interest in producing and distributing organic fertilizers based on human feces (Cofie and Koné 2009). Such products are considered promising solutions for diverse problems in developing countries, including issues of urban sanitary waste disposal (Lydecker and Drechsel 2010; Murray, Mekala, and Chen 2011) and poor supply of fertilizers for local agriculture (Erni et al. 2010). In recent years, diverse treatment processes have been developed for the production of effective and safe feces-based fertilizers (Cofie et al. 2006; Cofie et al. 2009a; Van Buuren 2010; Van Rooijen et al. 2009). The vast attention to technical and medical aspects has sparked questions about the cultural acceptance of feces-based fertilizers, though this has received relatively limited attention. Danso et al. (2006), Lydecker and Drechsel (2010), Mariwah and Drangert (2011), and Cofie and Koné (2009) studied acceptance in Ghana but for different regions and with highly diverse results. These acceptance studies however do not or only superficially

connect with the rich anthropological literature on feces and defecation in Ghana. Social scientists have characterized parts of Ghana or even Sub-Sahara African societies in general as “fecophobic” societies, in which human feces evoke strong negative cultural connotations (Dellström Rosenquist 2005; Van der Geest 1998; Warner 2003).

The limited cross-reference between literature on acceptance of feces-based fertilizers and social scientists’ accounts of fecophobia in parts of Ghana evokes the question to what extent these seemingly contrasting phenomena can coexist. The current study examines whether the identified negative perceptions of Ghanaians towards human feces, strongly embedded in culture and daily practice, will have consequences for the adoption of feces-based fertilizers. We elaborate on Van der Geest’s encounter with the work of Mary Douglas (2002) on social and cultural meanings of dirt and the concept of dirt as “matter out of place.” In general terms, we intend to encourage further debate on a topic which seems underexposed or even taboo in academics due to its unappetizing nature (Black and Fawcett 2008). This taboo limits the understanding of its problems and opportunities, including social-technical configurations related to new feces-based technologies (Jansen 2004; Jansen and Vellema 2011).

We begin with a presentation of methodology and background information. Subsequently, we introduce a naturalistic and a culturalistic perspective on the hypothesized non-acceptance of feces-based fertilizers in the study area which seems to result logically from the notion of fecophobia.

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Empirical findings are presented and discussed, including a reflection on previously discussed theories and concepts, after which we draw conclusions on sociocultural acceptance of feces-based fertilizers in the study area. We conclude that, although the appearance of fresh human feces is associated with negative perceptions of moral badness, dried or treated feces have lost this symbolic and intimidating meaning. Changing the appearance of feces is a physical and symbolic way to give feces a new meaning as useful artifact instead of bodily secretion.

Study Area and Methods

In order to assess the possibilities of distributing fertilizers based on urban sanitary waste from Accra, we selected a study area of thirty km around Accra. We distinguished between various groups of people who are in different ways involved in fertilizer business or use. The core of our sample consists of thirty-five fertilizer users, stratified according to business/crop type (small-scale vegetable cultivation, large-scale staple crop cultivation, ornamentals production, etc.) This stratification was applied since we assumed that acceptance of feces-based fertilizers may differ for consumed vs. ornamental crops and even for different types of crops. The sample was moreover stratified in terms of gender, age, ethnic background, region of origin, education, and income level. The aim here was not to test statistically hypotheses on the influence of these variables but rather to ensure that all potentially relevant groups were taken into account. The relevance of these variables was deduced from resources which mention them as influential factors in acceptance of feces-based fertilizers, for example, Mariwah and Drangert (2011) for gender and education, Danso et al. (2006) for age and income, and Cofie et al. (2009a) for ethnic background/region of origin.

Stratification of the research sample was first done in the selection of five villages, which were found to be often homogeneous in terms of business/crop type. Two locations were selected where primarily vegetables were cultivated (Korle Bu and Dzorwulu), one for flowers/ornamentals (Spintex), and two for tree and staple crops (Ashaiman and Maame Dede). Within each village, snowball sampling was applied to obtain a diverse sample in terms of ethnic background (including Ashanti, Fante, Akuapem, Dagomba, Ewe, Ga, Busanga, Bissa, and Ada), region of origin, gender, education, age, and income level. Snowball sampling was considered appropriate because it allowed us to use respondents' knowledge on characteristics of their fellow villagers in a context where no documentation of such characteristics was available. It also allowed us to diversify our sample "as we went," based on intermediary research results.

With twenty of these thirty-five fertilizer users, in-depth individual interviews were conducted. The other fifteen respondents were divided over three focus groups for discussions on the topic. Whereas in-depth interviews were valuable for assessing personal opinions, feelings, and meanings given to feces and fertilizers based thereon, focus group discussions

were valuable for observation of respondents' social behavior when discussing this topic. Because of the expected sensitivity of the topic, interviews and discussions were conducted as much as possible in confined settings (in private buildings or on farm fields) and in local languages with assistance from two experienced Ghanaian interpreters.

Beside this core group in our research sample, we also conducted surveys with twenty crop consumers. They were selected and surveyed in a shopping mall, in front of a supermarket, because that provided an interesting starting point for a brief conversation ("Do you know where these vegetables come from?") with a diverse group of consumers—as the mall is a meeting place for groups from all socioeconomic backgrounds. Moreover, semi-structured interviews were conducted with six market women who form a link between commercial farmers and the consumers of their crops. The sample was completed by two experts from the University of Ghana (on respectively agricultural extension and development and environmental and sanitation studies) and five government officials (including low- and higher-level officials from the Ministry of Agriculture, an extension officer, and officials from the Food and Drugs Board and the Pesticide Fertilizer Regulatory Service Directorate). All respondents gave their informed consent for the use of a voice recorder. Interviews were conducted in November and December 2012.

Data were qualitatively analyzed to identify patterns, similarities, and differences in respondents' answers. We used both inductive and directed codes to make such analyses possible. We only present a few quantitative research findings, where we believe it is meaningful (for example, in comparing the composition of our research sample to those in other studies).

Fertilizer Use in and around Accra

Fertilizer users in and around Accra comprise mainly farmers, including 800 to 1,000 small-scale urban farmers (Van Rooijen et al. 2009), but also flower growers and gardeners (Cofie et al. 2009a; Van Rooijen et al. 2009). Farmers cultivate year-round traditional and exotic vegetables and to a lesser extent staple and fruit crops for their own consumption and commercial purposes (Addo 2010; Asomani-Boateng 2002), supplying 60 to 90 percent of the fresh vegetables consumed in Accra (Van Rooijen et al. 2009). Various fertilizers are available. Despite Asomani-Boateng's (2002) and Danso et al.'s (2006) reports that chemical fertilizers are not preferred due to their expensiveness and risks of soil depletion, the same authors report that 34 and 27 percent respectively of the farmers in the area use them. In our research sample, about two-thirds of the respondents reported use of chemical fertilizers, with flower growers as the main non-users. Organic fertilizers are used by more than half of our respondents and our respondents generally value organic fertilizers more than chemical fertilizers but encounter problems of low and irregular availability. Poultry manure is the most common organic fertilizer (used, and often purchased,

by two-thirds of our respondents), probably because of its low price and long-term effectiveness (Danso et al. 2006), in particular for leafy vegetables (Erni et al. 2010). Most farmers in our sample buy poultry manure via an intermediary or cooperative; especially for urban farmers; it is not common to have their own poultry or livestock as a source of organic fertilizers. Our data as well as Danso et al.'s (2006) suggest that cow dung is more popular among flower growers and gardeners but not as widely available as chicken manure. Compost is scarce in and around Accra and seldom used. The city's two compost stations have limited and irregular production and are unknown to most farmers (Danso et al. 2006). None of our respondents reported to use compost; many were not familiar with this type of fertilizer. Blacksoil (fertile topsoil from fallow lands and forests) is used by many flower growers (Danso et al. 2006). Human feces, known as nightsoil, are reported to be used in Northern Ghana (Asare and Kranjac-Berisavljevic 2003), but there is no evidence of its use in and around Accra, and none of our respondents reported to use human feces.

Below we explain why feces-based fertilizers are seen as potentially useful and then discuss two perspectives on why Ghanaians may object to the introduction of feces-based fertilizers. A naturalistic perspective points at the material characteristics of feces, while a constructivist or cultural perspective underlines possible objections due to the meaning of dirt.

Feces-based Fertilizers—Opportunity or Cultural Impossibility?

As mentioned before, feces-based fertilizers can contribute to solving two major problems. First, 50 to 75 percent of Ghana's municipal budgets are spent on urban waste disposal (Mariwah and Drangert 2011) and could be saved if wastes are used as valuable inputs. Second, despite the vast quantities of imported and heavily subsidized fertilizers in Ghana (Honfoga n.d.), putting pressure on the national budget (Ministry of Food and Agriculture 2012), farmers complain about their availability, and authors report that a thirteen-fold increase in their application is needed to meet soil nutrient demands (Honfoga n.d.) Feces can partially fill this gap: an average annual amount of feces from one person contains sufficient nutrients to produce about 250 kg of grain (Cofie et al. 2009b). Co-composting with other organic wastes (for example, from

markets) allows their different nutrient values to complement each other and creates a product that can substitute part of the currently used chemical products (Cofie and Koné 2009; Murray, Cofie, and Drechsel 2011).

The prospects of using feces for fertilizers inform questions about possible cultural objections to feces-based fertilizers. Cultures differ in their perceptions of feces. While some are characterized as feces-friendly or fecophilic, assumedly due to ancient practices of using feces in agriculture (Black and Fawcett 2008), Sub-Sahara African cultures are generally characterized as feces-fearing or fecophobic (Dellström Rosenquist 2005; Jewitt 2011; Warner 2003). They typically perceive feces as something to stay away from or associate it with ritual pollution (Jewitt 2011).

Ghana is a special case among African countries because despite its relatively well-off economic position, it falls behind in terms of sanitation (Freeman 2010). The national coverage of improved sanitation of 12.4 percent in 2011 is significantly lower than the sub-Saharan average of 32 percent in 2004 (Bensah, Antwi, and Ahiekpor 2010) and the Millennium Development Goals target of 53 percent (Tagoe 2011). The situation is urgent for cities like Accra, where 30 percent of the approximately 350 tons of feces daily produced is not collected in any way (calculation based on Black and Fawcett 2008 and Lydecker and Drechsel 2010). Consequently, Ghana is consistently ranked low in terms of sanitation: it was ranked forty-eighth out of fifty-one African countries for progress in sanitation (Auwah-Nyamekye 2009) and WHO and UNICEF ranked it as Africa's fourth "least sanitary" nation (Freeman 2010). Ghana's sanitation problems, thus, are not purely economic but at least partly associated with other factors. Fecophobia in parts of Ghana has been suggested as a reason for the otherwise unexpectedly pressing sanitation problems in the country (Dellström Rosenquist 2005).

The same fecophobia seems a valid starting point for studying acceptance of human feces-based fertilizers. The reasoning goes as follows: if feces evoke strong negative connotations, people will not easily accept a product based on them. Various authors have hypothesized along such lines. However, their findings on "willingness to handle" human feces-based fertilizers vary greatly between different studies (Table 1). The high "indifference" in the study by Danso et al. (2006) provides more questions than answers: true indifference would be equal to acceptance, so what does this category

Table 1. Farmers' Willingness to Handle Fertilizers Based on Human Feces

| | Danso et al. (2006) | | | Mariwah and Drangert (2011) n=154 Cape Coast | Cofie and Koné (2009) n=unknown Kumasi |
|-----------------------|---------------------|-----------------|-----------------|--|--|
| | n=221 Accra | n=200 Kumasi | n=200 Tamale | | |
| Not willing to handle | 9% | 6% | 8% | 54% | 17% |
| Indifferent | 61% | 52% | 80% | | |
| Willing to handle | 29% | 42% | 12% | 36% | 83% |

mean? Unfortunately, the authors of these quantitative studies do not discuss the meaning of their findings in depth.

In the same body of literature, non-quantified statements regarding acceptance of feces-based fertilizers are generally vague and anecdotal. Bensah et al. (2010:128) report on farmers thirty km east of Accra refusing to use digested feces because of a “cultural stigma associated with the use of toilet as fertilizer.” McGregor et al. (2011:390) found that even well-treated human feces are unacceptable as fertilizer in Tamale, which leads them to conclude that “barriers [regarding the use of fertilizer based on human feces] are currently significant throughout Ghana.” Other authors point at more naturalistic reasons for non-acceptance. Apart from health reasons (see below), authors report anecdotal evidence on unacceptability due to diminished product flavor or color (Cofie et al. 2004), high costs, application difficulties, and ineffective control of soil-borne diseases (Danso et al. 2006). Farmers’ fear of consumer avoidance of crops cultivated with human feces is mentioned by several authors (Asare and Kranjac-Berisavljevic 2003; Cofie and Koné 2009; Cofie et al. 2004; Danso et al. 2006). None of the authors however elaborate on the meaning or commonness of such factors, except Danso et al. (2006) who report that expectations of consumer avoidance are considered by 4 percent of their respondents.

On the other hand, literature reveals acceptance of feces as fertilizers in several places and for several reasons. Some authors describe farmers in Northern Ghana hijacking sludge transporting trucks (Cofie et al. 2009a) and applying the untreated sludge directly on their fields, despite perceived problems regarding smell, transportation, and public mockery (Cofie et al. 2008). The only clear conclusion to draw from this literature is that degree of and reasons for acceptance vary highly within and between studied populations and, possibly, regions. We now turn to two perspectives on the non-acceptance of using human feces.

The Naturalistic Perspective: Fecophobia as a Health Issue

In a common naturalistic explanation, fecophobia expresses people’s concern about possible health risk of using feces. Actors promoting feces-based fertilizers try to address the diverse health risks leading to diarrhea and parasitic diseases. Pathogens including bacteria, viruses, parasitic protozoa, and helminths (Schönning and Stenström 2004) are transmitted via mouth or skin contact with contaminated feces, in any stage of their handling—before or during treatment, during agricultural application, via consumption of infected food, or via use of drained irrigation water (WHO 2006). The WHO (2006) set safe level standards for pathogens in fertilizers which can be reached through storage, heating, composting, addition of alkaline or urea, and incineration (Schönning and Stenström 2004). Despite these options for health risk reduction, many authors consider health issues to explain non-acceptance of the product by potential users (cf. Cofie et al. 2006; Cofie and Koné 2009; Lydecker and

Drechsel 2010). Such conclusions may, however, sometimes be drawn too easily. We demonstrate this by discussing important flaws in Mariwah and Drangert’s (2011:818) paper, who state that “97 percent [of respondents] agree that handling human excreta is a great health risk.”

First, quantitative studies may be biased due to suggestive questions. Mariwah and Drangert (2011:819) asked respondents to “agree” or “disagree” with statements such as “Handling excreta is a great health risk.” Such statements may evoke considerations of cultural politeness or feelings of ignorance vis-à-vis researchers and thereby lead to a bias towards agreeing.

Second, agree-or-disagree statements cannot clarify meanings attributed to health risks. Our data show that respondents’ reports on “health issues” often refer to social or moral rather than physical health—to health and hygiene (often used interchangeably) as indicators of social status. Diseases associated with feces often refer to nausea and loss of appetite resulting from feelings of disgust when perceiving feces, rather than diseases transmitted through pathogens. A vegetable and staple crop farmer from Ashaiman elaborates on the social dimension of feelings of disgust:

Somebody can come from his [high-class environment]... somebody can come in this area, to visit this area...when he comes and there is feces over the place, he will feel very bad, and he will go.

He perceives feces as a cause of disease (bodily feelings of disgust) due to association with lower social classes. Health issues discovered in research may thus have a different meaning than the researcher assumes: they may—as in this case—be associated with strong normative judgments about the difference between high-class (and “clean, healthy”) individuals and those with a lower status (“unclean, unhealthy.”)

Third, even if respondents see physical health risks of using human feces, the assumption that this decreases their acceptance of human feces-based fertilizers is not necessarily correct. Mariwah and Drangert (2011) found about half of their respondents unwilling to handle such fertilizers—which seems remarkably low, considering that 97 percent of all respondents consider handling excreta a major health risk. Of those unwilling to use feces-based fertilizers, a minority mention health considerations as the main reason. The authors then acknowledge that respondents’ belief in health risks, although high, is not a main determinant of their acceptance. Still, however, one of their conclusions is that “the majority of the respondents contend that human excreta should not be handled in any way *since* it carries a greater health risk” (Mariwah and Drangert 2011:821, emphasis added). This causal relation does not appear from the data; it is, however, illustrative of the framework in which authors often automatically interpret such findings. An alternative and in this area perhaps more correct conclusion is that, as Nimoh et al. (2014) found, a majority of farmers *agrees* that excreta reuse poses health risks, while *disagreeing* that they are unfit for use as fertilizers.

The Culturalist Perspective: Ghana is Covered in the Shit It Fears

A culturalist perspective explains non-acceptance of feces-based fertilizers from fecophobia or a strong aversion against feces in Ghanaian cultures. Van der Geest (1998, 2002, 2003, 2007) describes the paradoxical situation of fecophobic Akans (the major Ghanaian ethnic group) not putting much effort in getting rid of feces. Apparently, he tells his Akan research colleague:

[Y]ou [Akans] are so afraid of shit that you do not only want to remove it from your bowels but also from your heads. You don't want to think about it and you don't even tolerate it near your house. The fact that you have to pass through dirty places and feces is a consequence which you simply put out of your mind. You don't greet anybody on your way to the place [the toilet], you pretend nobody sees you and you see nobody. You go silently, as a thief in the night, and forget about it: a mental solution for a very physical problem. (Van der Geest 1998:12)

Van der Geest's viewpoint has inspired other authors' writings on feces and sanitation in Ghana (Jenkins and Scott 2007; Sumter 2008) and in other locations (Dellström Rosenquist 2005; Jewitt 2011a) but also on the use of human feces for fertilizer (Jewitt 2011b; Pickering 2010).

More importantly, Van der Geest's (2007) own inspiration, Mary Douglas, influenced the debate on feces and their use for fertilizers. The aim of Douglas' (2002) seminal book *Purity and Danger* is to explain the purpose of cultural categories of dirt or pollution versus cleanliness. She positions herself between scholars who claim that such cultural categories always have a material (often health-related) basis and those who distinguish "primitive" and assumedly unfounded concepts of dirt from Western, "rational" understandings. Central is her argument that "some pollutions are used as analogies for expressing a general view of social order" and as such are "symbols of the relation between parts of society" (Douglas 2002:4). Beliefs of what is clean and what is dirty then become landmarks of the social order they represent. In this framework, dirt is considered dangerous because it crosses boundaries of established categories: it is "matter out of place" (Douglas 2002:50), symbolizing the crossing of social boundaries. The human body is an important locus for such ideas because it naturally resembles society as a living, organic, composite body. Especially all that crosses bodily boundaries (sputum, sweat, and of course feces) is considered dirty because it symbolizes porosity of the human body and hence of society: "anxiety about bodily margins expresses danger to group survival" (Douglas 2002:154). In general, Douglas states, cultural beliefs regarding dirt and body margins mirror a specific situation in which society finds itself. She specifies two possible social meanings of human feces: first related to digestion, mirroring internal social processes, and second as symbols for bodily entry or exit points, associated with boundaries between social systems.

Douglas's theory inspired Van der Geest (1998, 2002) to draw a connection between physical and social purity in Ghana, reflected in practices such as bowel elimination as necessary "first thing in the morning" before starting social interactions. Feces, he concludes, "reveal the substance of social relationships such as closeness and distance, inclusion and exclusion, affection and dislike, trust and fear" (Van der Geest 2007:393). Similarly, Douglas's theory has been mentioned by other authors who describe human feces as maintaining or disturbing social order by being respectively in or out of place (Bradshaw and Canniford 2010; Drangert and Nawab 2011; Jewitt 2011a; Lathers 2006; Mariwah and Drangert 2011; Pickering 2010).

The question, then, remains: is the notion of dirt as matter out of place useful for explaining the meaning of feces in Ghana? Approaching feces as dirt implies a certain interpretation of its meaning and not the only possible one. Even in a society that has been characterized as fecophobic, "fear" of feces does not necessarily mean that they are considered dirt. Interpreting them as dirt in Douglas's definition makes them a source of pollution, something contagious. The concept of contagion forms the basis of the hypothesis that perceptions of feces-based fertilizers are related to general perceptions of human feces: this relation only exists if perceptions of feces "contaminate" perceptions of such fertilizers. Such contagion is not necessarily physical: Dellström Rosenquist (2005) argues that rather the *idea* of contagion makes an association with feces so repulsive. The easy and seemingly logical linkage between acceptance of feces and acceptance of feces-based fertilizer therefore follows from a conceptual choice and is not necessarily based on empirical evidence of mental linkages in the concrete world. As we will see in following sections, our data encourage a refinement of exactly this aspect of some culturalist perspectives.

Acceptance and Non-acceptance of Feces-based Fertilizers

Our interviews and focus group discussions reveal very diverse levels of and reasons for acceptance of human feces-based fertilizers. Some are enthusiastic about their positive characteristics and report to be willing to use them as soon as they are available. Others find the idea of using human feces so disgusting that they say they will never consider it. Respondents between these extremes show a variety of more moderate viewpoints.

Respondents who readily accept the use of feces-based fertilizers often report some experience or familiarity with their use. They talk about feces-based fertilizers in a positive tone: human feces are known to brighten the green color of leaves and to increase long-term soil fertility. Many know neighbors or relatives who have used human feces.

For those who do not readily accept feces-based fertilizers, fear for customer avoidance of crops fertilized with such products is often an important consideration. A vegetable farmer reports:

When people realize that you are associated with human feces, they have very bad perceptions. Saying that all they will know you are doing is no good. . . . Before you realize, your whole farm has been tagged. And when it has been tagged, your business is destroyed.

This respondent considers education of the public very important for farmers' acceptance of the product. On the other hand, many interviewed farmers and market vendors realize that consumers generally do not know what type of fertilizer is used for their food. Interviews with consumers revealed that most of them are indifferent to the type of fertilizers that are used, even if they contain human feces.

Without claiming any statistical generalization, views regarding acceptance vary a lot. One in four respondents considers feces-based fertilizers more acceptable for food production than for non-food crops (flowers and garden plants), often because they believe that that sector requires more fertilizer. One in five considers feces-based fertilizers less appropriate for food crops than for non-food crops because of feelings of disgust. For half of the respondents, acceptance is related to other considerations. In many cases, however, respondents did not indicate a reason for accepting or not accepting feces-based fertilizers. Questions regarding the use of feces often only yielded repeated statements such as "I can't!" or "It's not good!" Many interviewees relate acceptance of feces-based fertilizers to their physical appearance: fresh feces are generally considered disgusting and unfit for use as fertilizers, while dried or treated feces are more acceptable. Yet again, not all respondents make this distinction: some find both fresh and treated feces unacceptable, while others find both acceptable as fertilizers.

Views about acceptance may be influenced by various factors. The following came clearly to the fore in our data. First, region of origin appears to be important. Respondents from northern Ghana generally found the use of feces as fertilizers less problematic than their southern neighbors. Some respondents mentioned that northerners have traditionally been associated with occupations that include the handling of feces, which corresponds with other authors' findings (Asare and Kranjac-Berisavljevic 2003; Cofie et al. 2009a). Second, respondents point at the influence of authorities—especially agricultural extension officers, but also the government, companies or experts, and religious commands—concerning their appreciation of fertilizers. So far, extension officers have not yet promoted human feces-based fertilizers because they are not recognized as official fertilizers, says an expert in agricultural extension and development. Official documents confirming the effectiveness of fertilizers are reported as important channels for such actors to influence opinions. Finally, social contacts are important. Some respondents indicated that they simply copy neighbors' behavior when choosing fertilizers. Others indicated that they do not want to use feces-based fertilizers because they fear unacceptance by their social environment. The influence of authorities and social environments was confirmed by an expert in agricultural extension

and development. She emphasized the importance of trust relationships in both cases: extension officers are influential because they have long-standing relationships with farmers, and farmers' closest relationships (colleagues, friends, relatives) strongly inform choices on agricultural inputs. On the other hand, the influence of extension officers should not be overestimated: Bentley et al. (2010) found that Ghanaian rice farmers "by nature" experiment with new technologies, despite the skepticism of extension officers.

Based on these data, we cannot conclude that potential users of feces-based fertilizers generally accept or do not accept them. The data rather show varying perceptions and influential factors. However, we can conclude that the use of feces-based fertilizers is not entirely *unacceptable*. To the contrary: a vast majority of the respondents indicated willingness to buy such products if certain conditions are met. Even though these conditions are not always realistic (such as unfeasibly low prices), these findings suggest that most respondents do not have fundamental objections to feces-based fertilizers.

The latter seems surprising in the light of an assumed fecophobia. Many interviews, however, suggest a difference between (raw) feces, associated with defecation and evoking disgust, and (dried or treated) feces intended for use as fertilizers, no longer having such connotations. Many respondents reported to be willing to use feces-based fertilizers but also indicated that feces are repulsive to them—often to the extent that they cannot bear to see them. A staple crop farmer from Maame Dede easily makes this distinction:

Author: But the fact that it is coming from human feces—do you think that people will be less willing to buy it...?
Respondent: Well, why? You wouldn't see it as toilet [feces]; it's fertilizer!

Like many others, this farmer indicates that feces as a waste and as a fertilizer are two different things, with different cultural connotations. This contradicts those perspectives on pollution that suggest that the dirt in human feces could make feces-based fertilizers equally dirty (e.g., Mariwah and Drangert 2011). To explore the distinction between raw feces and feces converted into fertilizer, we first discuss our data on perceptions of feces in relation to Van der Geest's and Douglas's arguments and then return to the use of feces as fertilizer.

Feces and Disgust

Disgusting Badness

Our findings to some extent confirm Van der Geest's (1998, 2002, 2003) conclusions concerning fecophobia in parts of Ghana. When we showed respondents a sample of "feces" (in fact, a mixture of peanut butter and garden soil), their first reactions were mostly full of disgust. Fertilizer users from three villages articulated their feelings as follows:

I feel disgusted!...[laughing] If someone sees [these] things around you—it's not hygienic, it's not appetizing.

I don't feel fine...it makes me feel...bad....

When I see it? I feel bad...I don't feel the air that I'm breathing. The atmosphere is very bad.

It looks like dirt. And as humans, we don't have to come close to it.

Questions about origins or reasons for such feelings never yielded much response, which suggests that respondents are unable or unwilling to express such reasons. Although feelings of disgust towards feces appear universal, there seems to be something special about our respondents' perceptions. Their expressions indicate that their disgust of feces originates from its "badness," appearing from the body's natural repulsion of feces. A flower grower and a fruit/vegetable farmer remark:

You know, it's not good...[That is] exactly why it came out.

[We] see it as something bad because it comes...we take it out of our body. So once it comes out, we...it's not good, it's a bad thing.

This badness has a spiritual notion. A staple crop farmer from Maame Dede and a market woman from Accra state:

The bible even says that, whatever enters the body is good, but whatever comes out of the body is bad. So for you to touch human feces, it's bad.

Because it [feces] is from our stomach, and God knows it's not good.... That's why he separated it...and how come you use it for another thing again?!

If the body naturally or divinely secretes feces, in a symbolic context of badness, people extend this secretion to distance themselves even further from their badness. A flower grower underlines this moral dimension by equating feces and badness:

When it [feces] came [out of my body], I'm free.... All the bad things in you have been flushed away.

This moral meaning has social implications. Feces as physical badness symbolize social badness—that is, in compliance with social standards or a low social status. Talking about feces and defecation, respondents use terms of being sensible, civilized, enlightened, appropriate, serious, from a good home—or, to the contrary: abnormal, stubborn, with bad intentions, bestial, uneducated, or simply mad. They classify "bad" and "good," corresponding with Van der Geest's (1998:9) statement that "[fecal] dirt symbolizes moral decay." Such moral decay is a concern for a farmer from Maame Dede:

The older time, you don't normally see feces around like presently because they don't allow that. But now, anybody defecates everywhere.... The difference is that, children of this day, when you tell them not to do it, they do it. Children are stubborn. And as there is lot of...when you ask them not to do something, they do the opposite.

Similarly, responding to the question what he thinks about people who defecate anywhere, he says, "I see you as a bad person; you don't have good intentions for the community." People's behavior regarding feces indicates their degree of compliance to social standards.

Feces are at least as offensive to their beholder as to their producer, which explains the ancient practice of putting feces in someone's house as an intimidation or even a curse. An interviewed consumer, a young man, reports:

The ones who want to intimidate you, they just bring feces. So...it has been done a lot of times. It usually happens in schools. When the community doesn't like the school, they will bring feces. Yeah. Somebody...in my church, somebody actually came just to put feces in my church once.

Similarly, a farmer from Ashaiman reports:

When we see feces, traditionally we believe that someone is plotting something evil against you. We see it as if someone wants to destroy your farm.

All data in this section underline the social meaning of feces as cultural, moral, or religious badness. In the next section, we show how this is related to the meaning of feces for personal issues of intimacy and control.

Intimacy, Porosity, and Control

Çakırlar (2011) remarks that partial nakedness is a prerequisite for defecation, making feces a symbol of "nakedness," automatically associated with intimacy. The idea of badness urges control over bodily porosity and protection of this intimacy. The problem is that the human body is not a closed circuit: it requires external inputs and generates waste. To exert some control over these mechanisms, humans developed habits of relieving themselves at intervals and in designated places (Salisbury 2011). The Ghanaian practice of defecating first thing in the morning is one form of such "controlled porosity." Van der Geest (1998) maintains that the Akan highly value this habit, in order to start the day on a clean state, to the extent that they use laxatives when "missing" one day. Feces staying inside the body are considered dangerous dirt, fermenting and causing diseases (Van der Geest 1998). Therefore, someone who has not yet defecated shuns the exchange of greetings until he has done so: carrying feces makes one unfit for social interactions. Such institutionalized forms of controlling bodily porosity portray the body as a site of expressing order and social control or status (Douglas 2005; Elias 1978; Tomes 2001; Turner 1994).

This conceptualization of feces and bodily porosity as a symbol of social dynamics should, however, not be overstated or replace other explanations. Our data do not justify far-reaching conclusions on connections between people's practices regarding feces and their social systems. Yet, some observations can be made, for example, regarding different degrees of intimacy or disgust. Our data confirm that not all

feces are equally intimidating. Van der Geest (2007) identifies an increasing order of experienced disgust towards feces, depending on who produced them: me, known others (including successively children, partners, and friends), and unknown others. He describes animals as a separate category because they do not fit in this framework: they are very different from ourselves and therefore intuitively less related even than unknown others, yet their feces are generally considered less disgusting than human feces. Our data suggest another hierarchy. Respondents incorporate animals in the distinctions they make and, remarkably, one's own feces can produce much stronger feelings of disgust than the feces of others. In the latter case, the connection between social proximity and disgust is reversed; social proximity sometimes *increases* instead of *decreases* feelings of disgust. A flower grower talks as follows about the effect of such proximity.

Even every normal animal disgusts his own toilet [feces].
So that's why I also disgust my own toilet [feces].

Respondents confirm the different levels of disgust. Another flower grower, for example, reports:

If I see an animal feces, I don't feel like that, when I see human feces... [negative gesture]... I can use my hands to collect cow dungs and all these things... but human feces, no! I can't!

Consistent with the literature, our respondents generally considered young children's feces less repulsive than adults' (Dellström Rosenquist 2005; Drangert and Nawab 2011). Van der Geest (2007) concludes that this is because of social proximity—a mother does not feel disgust for her baby's feces. But our respondents rather indicate structure or quantity of children's feces as a reason:

Especially babies, newly born babies... their feces are [less disgusting than adults' feces].... They do believe that the young ones, they've not started taking in solid food, and stuff like that, and their feces is not much... not much toxic, or like that.... When you take some foods like kokonte or fufu, those hard starched foods, the kind of feces you produce are hard....
The feces of children are not that heavy, it means that you don't see that much. An adult who defecates, I mean, the quantity of it alone... yeah. [laughing]

Young children's feces do not resemble adults' feces and hence are considered less repulsive, less intimidating. This direct reference to physical appearance as a measure for proximity besides social proximity brings us back to naturalistic versus constructivist explanations: neither of them can as a single theory grasp disgust in all its facets.

Badness and Sensory Perception

Social or moral notions of "badness" do not erase the importance of the individual experience of being in contact with feces. Our data underline the importance of sensory perception. A vegetable/staple crop farmer from Ashaiman remarks:

The whole thing is, like... the appearance of it, the smell of it, it's really bad, so....

Only after having coded the data we realized how important seeing is besides smelling. Virtually all respondents used the word *seeing* to describe their problems with accepting feces, such as a farmer from Ashaiman:

It's not a nice thing to see feces. And the feeling you have when you see feces, to the effect that you don't even feel like eating anything. It's a bad feeling to see feces.

The feelings of disgust associated with seeing or smelling feces evoke a reflex of distancing from it, farmers say:

The moment you see it [human feces], you just turn your eyes, as if you didn't see.... That's what you do.
If it is not seen, it's not disgusting. What the eyes have not seen, is not disgusting [laughing]....

People are aware that they are befooling themselves pretending that they do not see feces while knowing it is there. Similar to Drangert and Nawab's (2011:64) findings in Pakistan, in Ghana too "a man defecating behind his robe is not seen defecating, although any passer-by understands what is taking place." As long as you do not perceive feces, you can pretend they are not there.

Illustrative of the importance attributed to sensory perception is the statement by some respondents that seeing or smelling feces is a health danger, not only regarding social order but also physically and individually. A fruit/vegetable farmer explains:

Parents teach their children that feces have bad smell, and once you inhale the smell, it brings diseases.

Such statements correspond to Jenkins and Scott's (2007) conclusion that Ghanaians believe that sighting feces alone can transmit diseases, and Sommerfeld et al.'s (2002) finding that perceivable (environmental) factors rather than vectors and pathogens are considered by Ghanaians as causes for diseases.

If seeing or smelling feces evokes a reaction of distancing, we might expect to find provisions that facilitate this—for example, specific places assigned for defecation to prevent people from encountering feces unexpectedly. And indeed, although open defecation is a common practice, it is not practiced at any random place. People know the "defecation places" in their community: behind the school building, in the bush, or in so-and-so's field. Such designated places are often institutionalized to the extent that specific sections exist for men and women.

This also has an environmental justice implication. Fresh feces remind the beholder of his socioeconomic status: the poor who (more) often come across feces are constantly confronted with their low status (Baabereyir et al. 2012). If this notion would be transmitted to feces-based fertilizers, farmers being asked to use such products would then, in

effect, be asked to reinforce this confrontation. If such transmission or “contagion” does not take place, as we suggest in this article, the promotion of feces-based fertilizers does not have such negative consequences from an environmental justice viewpoint.

Feces-based Fertilizers: Matter in a Different Form

The importance of physical appearance explains why many respondents easily accept treated or dried feces as fertilizers while finding fresh feces disgusting. Dried or chemically treated feces are no longer recognizable as such, and therefore do not remind the user of his/her own feces. A vegetable farmer from Dzorwulu is ready to buy feces-based fertilizers if they are not fresh:

You see, when you see it's fresh, aii [gesture of disgust], there's something wrong. But when it is dry, you don't even see it's feces.

Many others shared similar feelings, indicating that they accept feces-based fertilizers as long as these are not visually associable with feces. Treatment therefore appears to be an important measure for interventions intending to increase acceptance of human feces-based fertilizers. It hardly matters whether fertilizers contain human feces, as long as you cannot see it. Indeed, changing physical appearance was the most common recommendation from our respondents when we asked them what would make feces-based fertilizers more acceptable for potential users. Vegetable farmers from Dzorwulu recommend:

When it looks like the way it's just like the chemical fertilizer, it wouldn't give a problem.
If you can do it like the chemical fertilizer, then fine! We will buy.

Such statements are promising for those who want to produce human feces-based fertilizers. They suggest that connotations of dirt associated with one physical manifestation of feces do not “contaminate” its other physical forms: regarding human feces as dirt does not necessarily imply that feces-based fertilizers are also dirt. To the contrary: if they manifest themselves in “the right form,” feces are acceptable for most respondents.

This attention to form and physical appearance has to be taken into account besides the notion of dirt as “matter out of place.” Fresh feces are out of place everywhere, according to most respondents. Farmers and flower growers generally know that human feces contain nutrients—yet most of them do not consider fresh feces to be “in place” on their fields. Perhaps contrary to other cultures, many Ghanaians do not consider fresh human feces in a toilet to be “in place”: wherever they are, even in the body, feces intimidate humans and evoke a sense of social deviance. Hence, fear for feces is not only the by-product of systematic ordering (Douglas 2002), but it is also influenced by physical appearance: dry or treated

feces are no longer feces and do not evoke the strong feelings of disgust that were once associated with it. The notion of dirt as matter out of place—in terms of a symbolic system of purity—needs to be connected with the notion that some forms of dirt are not fixed but flexible and can gradually change into slightly less dirty, almost not dirty, and not dirty at all. There is no reason to assume that feces-based fertilizers are “dirty” because fresh feces are; an automatic link of contagion between these categories does not exist. Physically and symbolically removing the “out-of-placeness” of feces leads to a new product which is not “culturally contaminated” by its original form.

Conclusions

Fresh human feces are intimidating; they symbolize porosity and “leaking” of moral badness. Respondents in this study find fresh feces disgusting because they remind them of their own badness. This corresponds with theories on cultural constructions of dirt as analogies of social order. Because encountering feces is confrontational, social customs and personal habits regarding feces intend to maintain an actual or mental distance between people and feces. This applies not only to an individual's own feces but also to other people's feces: seeing feces that remind you of your own is almost as intimidating as seeing your own feces. The larger the resemblance between a person's own feces and the feces he/she sees, the more disgust he/she feels. This is different from interpretations (Van der Geest 2007) that maintain that social proximity reduces disgust and suggests that both naturalistic and culturalist perspectives are needed to understand feelings of disgust.

Perceptions regarding human feces-based fertilizers differ to a great extent from those regarding fresh feces. Acceptance of such products seems high, and any non-acceptance generally relates to assumed freshness of the material. Dried or chemically treated feces seem acceptable as fertilizers because they do not physically resemble fresh feces—they are no longer considered feces but fertilizers. They do not remind people of their own feces and badness. They underwent a symbolic transformation (were symbolically taken away from their out-of-placeness) and became an artifact instead of a waste. Not only treatment or drying but also packaging and labeling contributes to this transformation. Agyekum et al. (2014) indeed found that packaging and labeling positively influence farmers' willingness to pay for feces-based fertilizers.

Concerning measures to influence the acceptance of feces-based fertilizers, much attention has been given to addressing health issues, following a naturalistic perspective. This study shows however that physical health risks are generally not the major issue of concern—certainly for fertilizers based on treated feces. Changing the product's physical appearance, influencing sight and smell, may have stronger impact on acceptance, even among fecophobic cultures.

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