As the world’s most ancient food crops, aroids or taro (L. Araceae) are embedded in many western and non-western cultures. ‘Everybody’ knows aroids. However, as plants and foods, they are reputedly difficult to recognize. The plants, but also aroid dishes, are of economic importance and an expression of social and cultural values for around 400 to 500 million people worldwide. However, aroids are little known outside of non-western food systems. The cultivation of aroids is foremost restricted to small farmers, and its consumption to ethnicities in and from sub-tropical regions and the developing world, where 60% of the world’s food is produced by around two billion small farmers, the vast majority living in extreme poverty. In the Western world millions of migrant workers consume aroids; and both migrants and edible aroids are held in low esteem.

Interestingly, several members of the aroid plant family are among the world’s most popular ornamental plants and held in high esteem by millions of westerners. Through art and design, these iconic ornaments have permeated western culture. Thus, aroids are part of broader realities. However, in spite of their economic and cultural importance and the recognised potential for wider use, outside of botany, natural science and non-governmental organizations (NGOs), edible aroids are a little known crop that have received scant attention. They are orphan crops with a not yet fully exploited potential to contribute to food security, poverty reduction and biodiversity. In the context of the world, and by communicating relevant aspects of aroids and the international food debate, this paper seeks to show and incorporate relevant, if not opposite, social dimensions of its uses.

The information presented in this paper is based on ongoing research into the worldwide distribution and use of edible aroids that includes observations, field work, desk research, writing, and formal and informal interviews and communications with end-users and specialized researchers conducted since November 2003 (e.g., Vaneker, 2007a; 2009b; 2011c; 2012d; 2012e). Propelled by the contribution of geographical maps to theoretical studies of food, this paper seeks to address the following questions:

1. How can data visualization through mapping contribute to intercultural communication between the various social dimensions that are familiar with aroids?
2. How can data visualization through mapping bridge the cultural, physical and mental distance between the communities cultivating and consuming aroids and those familiar with aroids as ornamentals?

The paper begins with a literature review on the social and cultural dimensions of food. The first section also provides information about the nutritional value of edible aroids and an overview of the various communities familiar with aroids. The next section highlights the socio-
visual dimensions that inhibit global cognizance and appreciation of aroids as edible; and the Methodology section explores the use of data visualization through mapping as a method to contribute to intercultural communication between the various social dimensions that are familiar and unfamiliar with aroids. The Data section shows the distribution of edible aroids in the context of the world and the world's poorest countries. We conclude with a reflection about the future studies of edible aroids in the global food system.

Key words: aroids, ornamental plants, visualization, mapping, food studies, food design

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Introduction: Food for Discourse
In the early 1970s, British anthropologist Mary Douglas observed that “[t]he absence of serious research into the cultural and social uses of food is caused by a more fundamental separation between food sciences and social thought” (1973 ed. 2003:2). Parallel to images and information, shifts in society resulted in new perceptions of food that by now have permeated every aspect of life. By reflecting upon the role of food in the social order, Douglas shifted the focus of scholarly interest (research) from the biological function to “social drama” (Jones, 2007). Food being part of the home and hearth, it inspired Douglas to investigate and ponder about the meal, resulting in her writings on the role and mysteries of food and categorisation in her landmark book Purity and Danger (1973 ed. 2003). Douglas started building on the work of scholars such as Margaret Mead and Claude Lévi-Strauss, the French cultural anthropologist on record as the first to demonstrate that cooking transforms food from nature into culture (1964).

At the end of the 20th century, interest into the cultural and social uses of food, in foodstuffs, gastronomy and ‘food politics’ has seen unprecedented change, and has gone from scarce to superabundant. Food became a popular topic for public discussion and academic discourse in the mid-1990s, resulting in a legitimate academic field that studies food from multiple perspectives, and methods from various disciplines and schools of thought. Currently the field is known as ‘food studies’ and considers multiple points of view from disciplines such as anthropology, sociology, history, but also nutrition, economics and statistics (Nestlé & McIntosh, 2010:159-179). Reflecting upon the history and recent developments, according to food scholar Darra Goldstein “[t]he study of food is not only acceptable but chic, and numerous academic disciplines are now embracing dissertations that explore issues surrounding food” (Smith et al., 2010:326-329). Since the establishment of ‘food studies’, the culinary revolution has expanded into other areas of popular, academic and visual culture.

Today, what we eat, where we buy our food, and why we eat certain foods and refrain from eating others, even our culinary heritage, is subject
to popular and scholarly discussions (Belasco, 2008; Nestlé & McIntosh, 2010; Smith et al., 2010). The transformation of food from nature to culture into ‘social drama’ is the result of vast changes in food production and consumption that started during the Industrial Revolution and has continued ever since. Since the beginning of the 20th century, the home garden and the ‘Mom and Pop store’ have been rapidly replaced by agribusiness and the supermarket. In the western world, instead of being part of the home and the hearth, food production and consumption have become part of a global foodscape that is dominated by industrialized (convenience) foods.

The physical and mental distance between the food that is on our plate and nature or the biological, resulted in a growing intellectual and cultural interest in food, all contributing to the acceptability of food as a topic for literature and conversation (Belasco, 2008:4-7; Freidberg, 2010:484). Currently there are many more meanings attached to food than is visible on our plates. Food aroids cross disciplinary boundaries; research on aroids is carried out, for instance, by natural scientists, botanists or aroids enthusiasts alike. However, the social, cultural and visual dimensions of aroids in the global food system are often research neglected areas (Ramanatha et al., 2010; INEA 2011). Apart from a legitimate field of academic studies, food more often today is considered a vehicle for artistic self-expression (Belasco, 2008:52). Since the 1990s, and following in the footsteps of the first ‘food designer’ Martí Guixé (Raimondi, 2011), a growing number of designers and artists are trying to bring new meanings to food through publications published by Gestalten, for instance, that reflect the popularity of ‘food design’ (See: http://shop.gestalten.com/books/food-and-beverage.html) and food design that wins competitions sponsored by the International Food Design Association (See: ifooddesign.org). Courses offered via the ifooddesign.org show that the ‘food designer’ or ‘food artist’ even has become a new profession and a new design discipline. In recent years, both in art and design, food more often is used to communicate messages and meanings, and to emphasize, reinterpret, explore or characterise existing relationships between food and food consumption.

Lacking a ‘perfect’ recipe, food studies now crosses disciplinary boundaries, and can encompass foodways, gastronomy, culinary history, as well as discipline-based approaches (Belasco, 2008; Nestlé & McIntosh, 2010:159-179). It is also generally understood that humans come to a situation with a different body of knowledge and presuppositions, and “…for when it comes to eating, humans are generalists, i.e. omnivores” (Belasco, 2008:7). In addition food studies should not be hindered by “separate spheres” or as Belasco states: “…to help us sort out the issues and gain some needed perspectives, we need generalists” (2008, 3, 7). The most common objective of food design is to alter features and interfere with food (products), or as a 2006 Food Design Manifesto from the Italian Associazione per il Disegno Industriale (ADI) states: “Food Design is the culturally-aware design of products in which food and tools work closely together, blending the features necessary to meet a requirement linked to the consumption of a food product, into a single interface” (ADI, 2006).
Edible Aroids

Globally, roots and tubers are considered important staple foods. Aroids, or taro (L. Araceae), are the sixth most important root and tuber crops, and rank fourteenth among staple vegetable crops, and are thus significant in the global food system (Scott et al., 2000; Ramanatha et al., 2010). Aroids are a reputedly difficult group of plants to recognize, the identification of the many different wild and cultivated aroid genera and species requires a trained eye (Bown, 2005). According to botanist Simon Mayo, a leading authority on aroids, “[a]roids, or Araceae, are plants which everybody knows but relatively few people recognise” (2005, 11). In contrast to major staples such as wheat, rice and potatoes, for which overlapping names exist, aroids lack vernacular names that can be widely recognized or adopted. Already in the 1970s, the confusing nomenclature inspired Julia Morton (1912-1996) to introduce a general name for aroids, the American botanist states “The existing confusion is a serious matter for the agriculturist seeking information.” (1972). Currently the only consistent nomenclature for aroids is in Latin (Morton, 1972; Vaneker 2009b; 2011c; 2012e). Aroid genera, but also aroid species and their edible plant parts, carry a multiplicity of overlapping, common and uncommon names in numerous languages and dialects such as belembe and cocoyam, dalo, eddoes, kimpool, malanga, rascadera, tales and macabo (e.g., Flach, 1996; Elevitch, 2011; Vaneker, 2012e).

The aroid plant family comprises over 120 genera and 3750 species of which many are used as food, medicine, animal fodder, ornamental plants and cut flowers (as depicted in Figure 1). As a food, aroids have been maintained by farmers for millennia in a wide range of agro-ecologies, including marginal, complex and often harsh environments, still they are little known outside of non-western food systems, (Ramanatha et al., 2010; INEA 2011). Apart from an ecological unique crop, as a plant and food, aroids are embedded in many western and non-western cultures.
where they are often perceived as intrinsic to cultural identity (See Figure 2). All plant parts of aroids are edible, and the plant (parts), but also aroid dishes, often carry a deep symbolic meaning and cultural value (e.g., Matthews, 2004; Ramanatha et al., 2010; Elevitch, 2011; Vaneker, 2012d; Misra & Nedunchezhiyan, 2012).

The five most important cultivated aroid genera, used as food, but also medicinal and as animal fodder, are:

1. Alocasia, a genus in excess of 100 species. Common names include Elephant Ear, False or Giant Taro
2. Amorphophallus, a genus of more than 257 species, commonly
known as Elephant Foot Yam, only 4 species are used as food and medicine.

3. Colocasia, or taro, is the world’s best known aroid genus, since ancient times it is cultivated throughout the tropics and temperate latitudes such as the Mediterranean, China, Japan and New Zealand. The ‘Eddoe’ (L. Colocasia esculenta var. antiquorum) and ‘Dasheen’ (L. Colocasia esculenta var. esculenta) are the most popular species (Ramanatha et al., 2010);

4. Cyrtosperma, a small species of aquatic aroids indigenous to Southeast Asia, commonly known as Swamp Taro (Bown, 2005; Misra & Nedunchezhiyan, 2012)

5. Xanthosoma, or tannia, the only indigenous American aroid genus widely used for food. The 2 main cultivated species are the X. sagittifolium (L.) and X. nigrum (synonym L. violaceum)

The main centres of origin and diversity of aroids are tropical Asia and tropical America. Whereas taro, elephant ear, elephant foot yam and swamp taro originate in Southeast Asia, tannia is the only indigenous American aroid widely used for food. Together with taro, genera’s of tannia are the most widely grown and consumed aroids (Matthews, 2004; Bown, 2005; Ramanatha et al., 2010).

Problem: Socio-visual Dimensions that Hinder the Global Perception of Aroids as Edible

As a food for the poor and ornament, aroids are part of different if not opposite social dimensions that contribute to its lack of a global reputation as edible. Since times immemorial, plants and flowers have been used for decorative purposes, and are depicted for their cultural value. Because many aroids have a striking inflorescence and leaves, since the beginning of commercial floriculture (Schmidt 2002-2012), around two hundred years ago, new genera and species have been discovered and are cultivated purely for decorative purposes (Ramanatha et al. 2010:1-28). Annually around 50 million ornamental aroids are sold worldwide (Schmidt, 2002-2012; Bown, 2005:24). At present, species of the Alocasia, Anthurium, Caladium, Dieffenbachia, Philodendron, Spathiphyllum, Zamioculcas and Zantedeschia are among the most popular ornaments and cut flowers worldwide. In the Netherlands, aroids are a common feature in living rooms and on windowsills, in recent years, through photography and as unique felt objects, the iconic ornaments became part of Dutch design and art (Claessens; Van Empel, 2006; Den Hollander, 1992-94; Franken, 2011; Driessens and Van den Baar, 2011).

Aroids are primarily cultivated by subsistence-oriented farmers in around 120 sub-tropical countries where smallholder farming is directly and indirectly related to 75% of the poverty in rural areas (Paalberg, 2010). Whereas especially in the western world, the physical and mental distance between the farm and the plate has increased, this distance remains less vast in the non-western world where around 60% of the world’s food is produced by around 2 billion small farmers the vast majority living in extreme poverty. In addition, 70% of the food of the around 1.4 billion poorest people in the world is cultivated, in the sub-
tropics and the developing world, the vast majority living in extreme poverty (Paalberg, 2010; INEA 2011; Bioversity International 2012). At present Europe and the United States are home to over 100 million migrants many of which come from poor (sub) tropical areas of the world. According to a United Nations compilation of migration statistics, in 2005, the United States was home to 38 million migrants and Europe to 64 million migrants (United Nations, 2005). Migrant food culture is often shaped by memories of food and eating in the past, in the global North migrants developed a strong appetite for the foods, ingredients and dishes familiar from their homelands and cultures. The transnational (food) trade enabled migrants to procure important traditional foods, and maintain their foodways and food culture (Kloosterman & Rath, 2003; Tuomainen, 2009). Although food habits are among the last cultural traits to change, and “...food is among the most powerful of all social indices of differences and identity” (Mintz 2008:11), migrant food culture is research neglected. As Tuomainen (2009) notes: “Few studies in the past have examined the patterning of food and eating among first and second-generation migrations in detail. In addition, migrant foodways and foodstuffs are often neglected or perceived as inferior. This is also reflected in terminology expressing the inferiority of non-westerners, and in particular Africans. For instance, the German scholar Johann Boemus “…divided the people of “Affrike” not only into “Ethiopians,” and “Egypt-tians,” but also into numerous clans including…”Ryzophagi” (root eaters)...” (Hudson, 1996) Also nowadays food-related terms play a significant role in the depiction of foreigners and foreignness, and the stigmatization and denigration of minorities and their cuisines ironically using food-related words (Mintz, 2008; Vaneker, 2012d). Vaneker (2012d) discusses examples of the stigmatization of Surinamese food in the Netherlands--“[a]ctually it looks like dirty sludge...[a]fraid to touch it, let alone taste it.”

Globalising the benefits of edible aroids
Especially in the sub-tropics and the developing world, aroids are staple food for the rural and urban poor, and a source of income for millions of small farmers. As cash crops, they are an important source of employment and income particularly for men and women (Scott et al., 2000). Also, apart from rich sources of carbohydrates, protein, minerals and vitamins (Opara, 2003), aroids are the oldest cultivated crops. The plants, but also aroid dishes, are an expression of social and cultural values for around 400 to 500 million people worldwide (Scott et al., 2000; Ramanatha et al., 2010). Prior to the 1990s, aroids received scant research attention, only recently international research collaborations and networks, like the International Network for Edible Aroids (INEA), have been established. Due to their importance, in recent years, aroids became part of the global debate about the increase of food production, food security, reduction of poverty, biodiversity, and the protection of the environment (Scott et al., 2000; INEA 2011; Bioversity International 2012) with Ramanatha et al. (2010) being the first publication to explore the global diversity and uses of edible aroids. The question is: Can visualization of geographical maps show the significance and various social dimensions of aroids and consequently generate more awareness for a relatively little known and
stigmatized but important sub-tropical crops?

Methodology
The acclaimed art-critic and writer John Berger writes that “seeing comes before words”, when we see images and art we are not just looking, because what we see depends upon our own way of seeing, and when we try to comprehend or explain what we see, we use words (Berger, 1972 ed. 2008). In every social dimension of the world we use words to describe what we read, hear, smell, and taste, and sometimes also make mental pictures of words. Berger observes that although images abound everywhere, there’s a growing distance between culture and nature, and instead of a collaboration, human representations of the visible world increasingly demonstrate spectacle (1997).

In addition the world is increasingly information-based, and excessive amounts of images as well as information are constantly competing for representation. The awareness that “seeing comes before words”, has resulted in a growing demand for visual information and the development of many new forms of communication design. These changes have affected design and the role of the designer. Currently, communication design is shown, for instance, on billboards and in museums, and designers are more recently becoming authors and researchers rather than packagers of content. Design is not created in a vacuum, but through a process that involves multiple perspectives and various forms of interaction and exploration of the environment.

It is generally assumed that data visualization, as a form of design, can bridge the cultural, physical and mental distance between various social dimensions. Data visualization on the other hand intends to make data perceptible; furthermore, it enables to address existing knowledge gaps, but can also seek to connect and bridge differences between various cultural dimensions. Data visualization in the form of maps are a universal and easily understood medium for intercultural communication.

Consequently the overall objective became to create a visual appealing yet informative visualization of aroids data, and show relevant aspects such as the confusing nomenclature, the global dispersal and the 5 most important cultivated aroids in the context of the low-income food-deficit countries (LIFDC). Currently there are 66 LIFDCs. The list was developed by FAO in the late 1970s, and is determined by 3 criteria (e.g. national income, net food import and self-exclusion).
There is only a limited number of visual overviews and maps available regarding aroids. To address this gap, from May to August 2011, desk research and data visualization resulted in an inventory of 121 tannia cultivating countries on geographical maps designed by a French visual arts undergraduate student. The maps, some of which are shown in Figure 3, served as the basis for graphically designed world maps and were disseminated at the Global Conference on Aroids: Opportunities and Challenges (Vaneker, 2012e).
Conclusion

This paper has discussed and shown the significance of aroids in the global food system, and various social and cultural dimensions. The maps and visualizations illustrate the vast cultural differences, and the distance between the farm, the plate and the windowsill, but also underline the importance of aroids as a food. By mapping aroids in the context of the world's poorest countries, this paper seeks to contextualise aroids in the global food debate, and thus generate more awareness for an important but neglected staple crop, that in the age of visual communication and the ongoing globalization of the foodscape, holds great promise and potential for the future. In order to contribute to livelihood improvements in the non-western world, and contribute to the future of food and the global food debate, many aspects of the history, social, cultural and visual dimensions of aroids need further exploration.

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About the author

Karin Vaneker graduated from the AKI Academy of Visual Arts in Enschede, the Netherlands and later attended Sint-Lukas, Higher Institute for the Arts in Brussels, Belgium. Since 1999 she has written articles about food for numerous Dutch newspapers and magazines, specializing in the cultural and other histories of ingredients and cuisines. In recent years she has written books, and contributed to several publications and reference works, such as the Encyclopedia of Food Cultures of the World (ABC-Clio), They Eat That? (ABC-Clio), Reimagining Marginalized Foods: Global Processes, Local Places (University of Arizona Press), Oxford Encyclopedia of Food and Drink in America, and the Encyclopedia of Food and Agricultural Ethics (Springer). In 2003, Vaneker started researching edible aroids (or taro), a venture that, in 2007, resulted in an exhibition in Amsterdam and several publications. In 2008 Vaneker & Slaats joined forces to combine their passion for food. This undertaking has resulted in several book publications, and the visualization of on-going edible aroids research. In the process, Vaneker & Slaats profit from their mutual expertise and experience to merge research based-content and visual design.

Erwin Slaats studied graphic design at Sint Joost Academy of Fine Arts in Breda before joining design studio BRS Premself Vonk in Amsterdam, the Netherlands. After working at Eleven Danes Design (Copenhagen), and for more than a decade, Slaats created visual identities and corporate communications at EdenSpiekermann (Amsterdam), for major clients such as the City of Amsterdam, Ministry of Justice, City of Eindhoven, the Dutch Tax and Customs Administration, TU/e Technical University Eindhoven, and Royal Wessanen. With a passion for food and books, Slaats has been designing several cookbooks and other book publications. In 2010, and with many years of expertise, Slaats founded LekkerOntwerpen (www.lekkerontwerpen.nl). The Amsterdam-based design studio combines tactile and innovative approaches to design. The mission and the motto of LekkerOntwerpen, meaning both ‘nice design’ and ‘delightful designing’, is to receive and transmit content into tangible and aesthetically appealing design. Clientele includes publishers, manufacturers, retailers, corporations and non-profit organisations such as GVB Public Transport Amsterdam, Meet.s Art Point, and Alzheimer Netherlands.