

Disability and Age Inclusive Water Management

A Position Paper



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1

Zeroing in on extreme poverty

This position paper makes an urgent plea to address chronic extreme poverty by seeking practical ways of including people with disabilities and the elderly in agricultural water management.

Extreme poverty is defined as earning less than USD 1.25 a day and chronic poverty as being in this situation for years on end. Among the chronic poor with disability, the elderly number greatly. One in five people living in extreme poverty has a disability¹, whereas 43 % of people with a disability in so called developing countries live in poverty². The probability of being in poverty rises in households headed by people with disabilities³ - as much as 60 % higher in Uganda⁴, for example. People with disabilities face much greater barriers in developing productive livelihoods than others. Compared to national averages, unemployment rates among people with disabilities are usually much higher. A study in Tanzania shows that households with a disabled family member have a mean consumption of less than 60 % of the average⁵.

Similarly, with demographic change, the elderly have come to constitute an increasingly large group of vulnerable people. The proportion of elderly people is large, especially in Asia and Latin America (11 % and 10 % in 2014) and expected to increase (to 17 % in 2030). As proportion of the total population, mostly older people live in rural areas and are dependent on farming. In fact all over the world, the age of the farming population is increasing. With reduced family-sizes and migration of the young and able-bodied in search of urban employment, extended families are in decline and the elderly more often remain on their own. This increases their vulnerability. Another phenomenon observed in some areas is that of older people living without younger relatives, therefor facing increasing difficulties working their fields and thus falling deeper into poverty. One can witness fertile farm land being abandoned as a result of this in some parts of the world.

1. DFID. (2014). *Disability framework leaving no one behind*.
2. Edge, James (2013). *Poverty, food insecurity and disability*. New Agriculturalist. <http://www.new-ag.info/en/focus/focusItem.php?a=3091>.
3. McClain-Nhlapo (2007). *Including people with disabilities in actions to reduce poverty and hunger*. 2020 Focus brief on the world's poor and hungry people.
4. Hoogeveen, J. G. (2005). *Measuring welfare for small but vulnerable groups: poverty and disability in Uganda*, *Journal of African Economies* 14:4, p. 603 - 631.
5. Elwan, A. (1999). *Poverty and disability: A background paper for the world development report*. Washington, DC. World Bank.

The two vulnerable groups - people with disabilities and the elderly - are closely connected. The WHO estimates that 38 % of people over the age of 60 have a disability (World Health Organisation/World Bank (2011) World Report on Disability (Washington)). The connection is double-edged, with more and more people with disabilities reaching old age.

In summary, there is a strong case to pay explicit attention to disability and aging as part of efforts to address chronic poverty⁶. People with disabilities are over-represented among the extreme poor, and are less likely than others to be able to move themselves out of poverty. The new Sustainable Development Goals are likely to aim for zero extreme poverty in 2030. This can only be achieved with the systematic inclusion of these two closely related vulnerable groups.

This paper explores the potential and possibilities of inclusion of the elderly and people with disabilities in agricultural water resource development. The position paper has been jointly produced by MetaMeta and Enablement, and is based on case studies, literature review and a Delphi expert panel. MetaMeta focuses on research and innovation in the field of water and natural resource governance. They offer specialised communication products, which are geared towards the international resource management and development sectors. MetaMeta's aim is to take practical 'how to' knowledge further by implementing and designing projects, training, commercial engagement and policy support. Enablement is a



Figure 1: Hadramawt (Yemen) - productive farm land abandoned and soil being shipped out for house construction

6. World Health Organisation/World Bank. (2011). World report on disability.

training, research and development institute that is specialised in Community Based Rehabilitation (CBR) and inclusive development of people with a disability. Enablement understands CBR as a strategy that aims to improve the quality of life of people with disabilities. It involves working closely with people with disabilities, their families and stakeholders at all levels to include them in every domain of community life. Enablement tries to contribute to innovation in educational approaches, tools and materials for anyone involved in CBR from grassroots to top management level (For more information, visit our joint website: <http://mmenable.wix.com/inclusionandwater>).

The position paper first describes the United Nations Convention on the Rights of Persons with a Disability that will compel larger attention to the inclusion of people with disability (section 2). It then discusses main strategies for involving people with disability and the elderly in agricultural water management (section 3) and gives a number of examples (section 4), before ending with conclusions and recommendations (section 5).

2 United Nations Convention on the Rights of Persons with a Disability

The United Nations Convention on the Rights of Persons with a Disability (UNCRPD)⁷ promotes the needs and rights of people with disabilities and specifically mentions the right to access safe water. The convention was adopted in 2006 and entered into force in May 2008⁸. Currently 145 countries have ratified it⁹ and more countries are expected to follow. Ratification of the UNCRPD obliges governments to pay specific attention to disability in all their development efforts, including those in the water sector. The main philosophy is to mainstream and include people with disabilities in society and economy and ensure that they are not isolated. Among its provisions, the Convention recognises: *“the right of persons with a disability to work, on an equal basis with others; this includes the right to the opportunity to gain a living by work freely chosen or accepted in a labour market and work environment that is open, inclusive and accessible to persons with a disability”*.

However, inclusion of people with disabilities and the elderly in all spheres of life is often restricted. Disability exists when people experience barriers to participation in society and when needs of people with disabilities are not taken into account. These barriers are not only simply physical or environmental barriers, but can also be attitudinal barriers, (for instance) in the form of discrimination or stigma (inflicted by the individual or the society), or institutional barriers in terms of (for instance) discriminatory legislation or employment laws¹⁰.

In addition, if only because of the sheer numbers of people with disabilities and elderly, there is an entirely opposite argument for dedicating attention to disability and aging, i.e. their economic contribution. The ILO (2010) estimated: *“Excluding disabled people from the world of work may cost countries 1 to 7 percent of their GDP”*. More positively stated, the potential economic gains from including

7. <http://www.un.org/disabilities/convention/conventionfull.shtml>.

8. United Nations Enable website. 2010. *Some facts about persons with disabilities*. New York. Department of social and Economic Affairs. (DESA).

9. For the continuously up-dated list of signatures see <http://www.un.org/disabilities/documents/maps/enablemap.jpg>.

10. Bruijn, P., Regeer, H., Cornielje, H., Wolting, R., Veen, S. van, and Maharaj, N. (2012). *Count me in. Include people with disabilities in development projects*, and; Jones, H., and Reed, R. A. (2003). *Water supply and sanitation access and use by physically disabled people*. UK. WEDC.

Box I: Defining disability

The UN Convention on the Rights of Persons with a Disability (UNCRPD)¹¹ uses the following definition: “Persons with a disability include those who have long-term physical, mental, intellectual or sensory impairments which in interaction with various barriers may hinder their full and effective participation in society on an equal basis with others”. Disability is therefore not an attribute of the person only. It is an interaction between the person and his or her environment. Interventions and actions aimed at enabling people with disabilities to participate in all spheres of life must therefore move beyond the traditional concept of rehabilitation and medical treatment. Enabling people to participate in social life can largely be achieved by addressing the barriers that hinder people with a disability in their day-to-day lives. These barriers are found in society all-too-often. Sometimes people with disabilities face internal barriers as well that may seriously affect their participation and functioning as members of their societies. For instance, it could be that people are not motivated to contribute towards their own development, or they may have low self-esteem and believe they are not capable of learning new things.

people with disability in employment are significant and outweigh the costs in the medium and long term¹². The same argument extends to the inclusion of the elderly: as populations age, and in some countries farming increasingly relies on older men and women, there is a need for people to remain engaged at older age. Aging, chronic health conditions and disability will place a greater (financial) responsibility on society, and as such, new and innovative ways need to be found to address the growing needs and demands of elderly people and people with disabilities. Keeping in mind the economic, personal and social gains (employment promotes self-esteem, confidence, feeling useful, reduces stigma, creates awareness in society about potentials of people with disabilities and results in acceptance), one can only see the benefits of including people with disabilities and the elderly in all spheres of life, including employment in agriculture and agricultural water management.

In several instances, ensuring disability-inclusive water management can be economically beneficial and may often only require small, low-cost interventions. The costs of adjustment or providing accessible facilities are estimated to be

11. Adopted by the UN in 2006; entered into force in 2008; 145 countries ratified at the time of publishing this paper.

12. Banks, L. M., and Polack, S. *The economic costs of exclusion and gains of inclusion of people with disabilities*.



Figure 2: Aged farmer working in a greenhouse, Shanxi Province, China

lower than the costs of treatment or of ad hoc techniques¹³. It is thus of great importance to ensure that new programmes are disability inclusive, right from their inception. Barriers to inclusion make people with disabilities unnecessary dependent, and often limit caretakers of people with disabilities from carrying out their own work.

13. Comprehensive Community Based Rehabilitation in Tanzania. (2010). *Changing lives, changing communities*. (CCBRT). Annual report.

3 Enablement through agricultural water management

Agriculture is a main employer - 35 % of the workforce globally and 60 % in Sub Saharan Africa are employed in this sector. Particularly in developing countries, where 80 % of the people with disabilities live, agriculture is an important sector for their enablement.

Moreover, agriculture and productive water management are in constant change. The FAO¹⁴ estimates that global food production needs to increase by 60 % from 2005 to 2050 in order to ensure that there is food for all. A substantial part of the increase would need to come from small-holder farmers in developing countries¹⁵. There is a need to modernise small-holder farming and ensure that it is a competitive and rewarding economic activity. The opportunities to achieve this higher plateau within the boundaries of existing resources are various¹⁶: better seeds and agronomic practices, better water management and moisture conservation, precision farming and small scale mechanisation and better post-harvest operations are some examples. As part of the modernisation of small-holder farming inclusive opportunities for people with disabilities and elderly need to be stimulated.

Though agriculture remains a main employer, there is little systematic experience with the enablement of people with disabilities. Disability is gaining attention in the closely-related sectors of Water, Sanitation and Hygiene (WASH), Public Health (prevention of water-borne diseases), and water-related Disaster Management (such as flooding). However, this is hardly true for agricultural water management, even though there is enormous potential with many positive effects for both the individual and the society at large. The potential can be realised by reducing institutional, physical and social barriers to productive employment in agriculture. They range from for example, measures to reduce exposure to disabling diseases and occupational risks (through prevention and promotion of good practices), promoting farming systems and techniques that have high added value but are low on labour requirements (adjustments), ensuring access to land and water resources for people with disabilities and the elderly (access

14. http://www.fao.org/fileadmin/user_upload/esag/docs/AT2050_revision_summary.pdf.

15. <http://www.cam.ac.uk/research/news/how-do-smallholder-farmers-fit-into-the-big-picture-of-world-food-production>.

16. <http://www.wbcsd.org/Pages/EDocument/EDocumentDetails.aspx?ID=16214&NoSearchContextKey=true>.

to resources) and positioning them in supportive or administrative positions. For all these measures, it is important to bear in mind that people with disabilities and the elderly are (often) not only disadvantaged, but also more likely to be chronically poor. Strategies for enablement must take into account that people with disabilities and the elderly usually have a thin resource base and are more exposed and vulnerable.

Following the central philosophy of the Convention on the Rights of People with a Disability, the preference is for a multi-pronged approach: promoting the inclusion of people with a disability and elderly in mainstream activities, while at the same time arranging special services as needed¹⁷. In terms of agricultural water management this could mean that people with a disability are engaged in mainstream farming, but have access to special tools or appliances (small mechanisation, modified tools, modified pumps, etc.) as well as arrangements that help in carrying out the work. Thus, while the starting point is the creation of equal opportunities, it is recognised that there may still be a need for special services in order to achieve inclusion. There are plenty of situations in the environment that are disabling and a distinction can be made between those that cannot be changed (e.g. difficult terrain, high economic barriers) and those that can be changed (e.g. suitable equipment, better physical access). For instance, while distance to the fields may form a large barrier to elderly people and people with mobility restrictions, home gardens, hydroponics and horticulture - which requires little space - may provide people with meaningful employment.

In addition, a third track deals with prevention of disabling diseases. Water can be a cause of disability as a result of contamination, or because it may contain certain chemicals such as fluoride. Water can also serve as a vector in the transmission of disabling diseases. In addition, agriculture has occupational hazards that are often ignored but may be a cause of disability too, especially for the poor who work in less protected environments.

Hence, when aiming at the inclusion of people with disabilities in (agricultural) water management, we should consider addressing the following three aspects: (1) mainstreaming disability with a strong focus on enabling environments, (2) attending to needs for special services and/or appliances, and (3) prevention of disabling diseases. Exploring the actual opportunities and obstacles for effective inclusion in agricultural water management is a way to bring laws and conventions, such as the UNCRPD, into real action and beyond this, may be an essential element in eradicating extreme poverty. Following the three tracks above, the

17. Yeo, R. and Moore, K. (2003). *Including disabled people in poverty reduction work: "Nothing about us, without us"*. *World Development*, 31(3), 571-590.

Table 1: Strategies to enable people with disabilities and elderly in agricultural water management

Track		Categories of activities
1	Mainstreaming	<ul style="list-style-type: none"> • Engagement in productive agriculture • Privileged access to land and water • Membership in farmer organisations
2	Special support arrangements and adjustments	<ul style="list-style-type: none"> • Special functions in agribusiness or management • Optimised equipment and tools
3	Prevention	<ul style="list-style-type: none"> • Prevention of disabling diseases • Labour safety measures

specific strategies to enable people with disabilities and elderly in agricultural water management can be categorised under a number of headings:

Water is crucial to food security and livelihoods. Agriculture is by far the main user of available fresh water resources: it accounts for 70 % of all withdrawals worldwide, compared to 10 % for domestic use, and 20 % for industrial purposes. In Africa, Asia and Latin America an even higher proportion of available fresh water resources is used for agriculture. Within this broad context, agricultural water management systems differ.

Three main agricultural water management systems are: (1) irrigated agriculture, (2) rain-fed and flood-based farming and (3) non-land based systems. The opportunities for inclusion of people with disabilities and elderly vary in the different agricultural systems. Below we discuss them and highlight opportunities for the inclusion of people with disabilities under different tracks.

Irrigated agriculture

Irrigated agriculture has been practiced for the last 4000 years. It allows for increase in productivity through controlled timing of water application and makes use of perennial water resources - either surface water or groundwater. Irrigated agriculture in combination with the use of improved crop varieties and modern agri-inputs has led to 24 % more food per person between 1961 and 1997, despite the population growth that occurred simultaneously¹⁸. Irrigated agriculture is therefore fundamental for food security and economic gains. It is

18. Wood, S., Sebastian, K., and Scherr, S. J. (2000). *Agroecosystems*. Washington (DC). International Food Policy Research Institute and World Resources Institute.

Table 2: Examples of activities to enable people with disabilities and elderly in irrigated agricultural water management

Track		Categories of activities
1	Mainstreaming	<ul style="list-style-type: none"> • Engagement in horticulture • Access to land • Well ownership • Membership in farmer organisations
2	Special support arrangements and adjustments	<ul style="list-style-type: none"> • Special functions in post-harvest handling • Functions in vermiculture or composting • Micro-irrigation • Water-saving devices • Small mechanisation • Transport • Special tools
3	Prevention	<ul style="list-style-type: none"> • Prevention of bilharzia, malaria • Labour safety measures

estimated that 35 % of the agricultural land in South Asia, 15 % in West Asia and 7 % in East Asia are irrigated. The figure for Sub Saharan Africa is less than this¹⁹.

Water for irrigation can be extracted from surface water sources (reservoirs, rivers, streams, lakes) or from shallow or deep groundwater sources, using a variety of techniques to distribute it to the fields (e.g. by gravity-based systems, pumping, open or closed canals, siphon, drip, or sprinkler systems). Whatever the scale and techniques used, the needs and potentials of people with disabilities and the elderly are generally not taken into account, even though often only simple adjustments in lay-out and design (special water lifting or operating gears) can greatly enhance chances of their meaningful participation.

Opportunities for the inclusion of people with disabilities and the elderly can be found in all aspects of irrigated farming, particularly in terms of making special arrangements to reduce the physical burden, such as minor mechanisation or the use of micro-irrigation systems (such as sprinklers or drip irrigation systems) that are less labour-intensive. There are also important opportunities in local farm transport (using small farm transport vehicles), to provide inputs such as

19. Wood, S., Sebastian, K., and Scherr, S. J. (2000). *Agroecosystems*. Washington (DC). International Food Policy Research Institute and World Resources Institute.

Box 2: Special tools for horticulture

A number of tools can enable people with physical disabilities to do horticultural work. Many of these are regular appliances with small adjustments, such as:

- Universal cuff with regular and enlarged pocket
- Padding or pvc handles on tools
- Hand form trowel
- Molded clip for small tools
- Glove grips



Figure 3: Examples of special tools (source: <http://www.hort.vt.edu/HUMAN/adapt.html>)

vermicompost to nurseries; or offer post-harvest services, for instance operating threshers or running local storages. These opportunities are high-value, physically less demanding, and also contribute to higher agricultural productivity.

Certain types of irrigated farming are also more amenable for people with disabilities and the elderly. In general, horticulture has advantages over staple crop production - particularly when combined with special tools to manage physical disability for instance (see box 2). There are also examples of ensuring privileged access for people with disabilities to ensure their inclusion in mainstream farming, for example by declaring special land titles, conferring well ownership (for veterans for instance) and ensuring their full membership in local organisations.

Rain-fed and flood-based farming

A second main category are rain-fed and flood-based farming systems. Rain-dependent farming systems make use of direct rainfall and run-off. Flood-based systems use short-term floods or temporary inundations. Rain-fed systems are the predominant agricultural system worldwide, covering 85 % of the total

cultivated area and supporting 58 % of crop production (Bruinsma, 2011²⁰). Flood-based systems cover an area between 20 - 35 million hectares in Africa and Asia and constitute a prime potential for agricultural growth. Main flood-based irrigation systems include flood recession farming, flood-rise farming, irrigation by inundation canals, Dambo cultivation (in local depressions, notably South Africa), and spate irrigation (see <http://spate-irrigation.org/>).

These systems have been relatively neglected, as they are often found in more remote areas, physically and politically away from the centres of power and hence less suitable for larger investments. Rain-fed and flood-based farming by nature are more risky than irrigated agriculture as they are dependent on rainfall or floods. However, they hold a large potential to make a dent into the challenge of future food security. At the same time, there are still ample opportunities to improve production through, for example, improved water management techniques aimed at restoring and retaining soil moisture (mulching, use of bio-char, etc.) and enhanced landscape management (bund construction, terracing, ridges, etc.). Supplementary irrigation is sometimes also practised in rain-fed systems, provided sufficient water is available. The gap between actual and potential yield is the largest in sub-Saharan Africa, with a potential to double



Figure 4: Local agricultural transport - opportunity for inclusion.

20. <http://www.fao.org/docrep/016/ap106e/ap106e.pdf>.

Table 3: Examples of activities to enable people with disabilities and elderly in rain-fed and flood-based farming

Track		Categories of activities
1	Mainstreaming	<ul style="list-style-type: none"> • Engagement in livestock operations • Membership in farmer organisations
2	Special support arrangements and adjustments	<ul style="list-style-type: none"> • Special functions in agribusiness or management • Special tools • Mechanisation • Hydroponics combined with water harvesting
3	Prevention	<ul style="list-style-type: none"> • Prevention of leishmaniasis, kala azar, malaria, sleeping diseases • Labour safety measures

yields with better low-input farming and proper water management. Bruinsma (2011) projects that rain-fed crop production will increase by 66 % primarily from better yields, without the need for new land development or loss of eco-systems.

Opportunities for inclusion of people with disabilities and the elderly in rain-fed and flood-based farming systems are more limited than they are in irrigated agriculture, due to their unpredictable nature and the dependence on field crops. Yet both sectors offer similar opportunities in transport and post-harvest operations. Rain-fed and flood-based systems are often well integrated with livestock operations providing opportunities in that area too. A special opportunity arises with the combination of local roof top water harvesting with circular farming systems - in particular hydroponics.

Non-land based farming

The third category of water management concerns non-land based farming systems. There is a large variety of opportunities: aquaculture, bag farming, greenhouse cultivation, production of spirulina or other algae, mushroom production, beekeeping, poultry and fisheries.

Such systems often combine main water sources with a multitude of activities. Multiple-use systems (e.g. combining water-use in fisheries, bathing, washing, drinking water, irrigation) have been in place for many years in some parts of the world, but are rapidly gaining more attention with water resources getting scarcer. They can potentially contribute much towards enhancing livelihoods within existing or to-be developed water infrastructure schemes.

Non-land based systems provide good opportunities for the enablement of people with disabilities and inclusion of the elderly. Many of these systems are skill-intensive, which may or may not be compatible with specific disabilities. Non-land based systems are less prone to labour safety issues or disabling diseases.

In project formulation and monitoring phases, environmental and social (including gender) impact assessments have become more or less standard practice. However, impacts on people with disabilities and the elderly, and the identification of possible inclusion and mitigation measures to offset negative effects are generally forgotten or ignored. There is also need to include preventive measures against disabling diseases and labour safety. Some organisations are beginning to pay attention to the need for disability assessments in programming and project-planning phases, and pay more explicit attention to the role of elderly in agriculture²¹.

Construction of water infrastructure and enhanced agricultural water management practices can substantially change landscapes at the large scale. Even at the micro-scale it can greatly affect the accessibility of individuals. For example, irrigation canals or buds can prove to be physical barriers obstructing people's mobility. Small bridges, hand-holds or steps and stairs designed to enable mobility through such barriers can become insurmountable for people with disabilities if not well designed.

Mechanisms and procedures of operation and maintenance of irrigation infrastructure may be complicated for people with disabilities, but simple adaptations or use of new techniques (for example, remote control for operating gates as being practised in parts of India) may lower barriers. Drip irrigation may not only lead to water saving, but could also be easier to operate than canal or flood irrigation. Furthermore, people with a mental disability are often well equipped to perform physical labour, for example, the construction or maintenance of irrigation and drainage canals, if well supervised. People with a physical disability can very well carry out administrative work (e.g. have a role in water users' organisations or agricultural cooperatives), or benefit in other ways from agricultural development (trading, processing). Simple capacity building or other support (such as micro-credit) may suffice but require special attention. As several studies have indicated, the overall benefits to people with disabilities, the elderly, and the society as a whole will be substantial.

21. http://www.usaid.gov/sites/default/files/documents/1868/disassessment_guide.pdf ; http://www.usaid.gov/sites/default/files/documents/1861/Final_Disability_Assessment_and_Analysis_7-20-13_FINAL.pdf.

4 Case studies

A number of cases are presented below that demonstrate the strong link between agriculture, food security, disability and aging. The case studies in this chapter indicate that people with disabilities and the elderly do have the capacities, skills, knowledge and wish to be active participants in water management and play a role in agricultural production, processing and trade. At the same time, they may face specific challenges, which need to be addressed to enable them to contribute to society's wellbeing according to their potential and ambition. Most of the case studies are about special initiatives and deal with various aspects of prevention and inclusion, as illustrated in the table below.

Table 4: Main enabling characteristics of presented case studies:

Case		Prevention	Mainstreaming	Adjustments
1	Innovative channel maintenance	X		
2	Urban agriculture		X	X
3	Fishing and grain storage		X	
4	“Spring” micro-irrigation		X	X

CASE I: Prevention: maintenance of irrigation channels in the Fayoum, Egypt

The Fayoum Weed Control Project and the subsequent Fayoum Water Management Project in Egypt introduced innovative methods of weed control in irrigation and drainage channels. Before the construction of the High Aswan Dam, water supply to irrigation systems depended on the flood regime of the Nile. Traditional methods of channel maintenance were a combination of excavation of silt during the off-season and the removal of aquatic weeds, both by manual labour. After the construction of the Dam, double cropping became the norm and canals would carry water throughout the year. However, with most of the silt intercepted at Lake Nasser, the water in the canals became clear and favourable conditions for aquatic weeds were created. Initial methods of mechanical cleaning resulted in severe over-excavation of the channels. As a

result, methods of manual weed control were studied and successfully introduced, creating substantial local employment opportunities in the process. However, the traditional way of manually cleaning the canals required labourers to stand in the water. With Schistosomiasis²² or Bilharzia (a potentially disabling disease) endemic in the area, the project has successfully developed and tested improved hand-tools, the main improvement being that large sticks were attached to the tools, enabling labourers to work from the channel banks without needing to enter the water. Thus, the risk of infection was substantially decreased. The tools, which can be easily produced by local blacksmiths, were subsequently introduced throughout much of the country.

Conclusion: *Simple local technology for the maintenance of irrigation and drainage channels that can be provided at minimal or no extra costs may restrict the spread of certain (disabling) diseases. Simple labour can be performed by people with intellectual I disabilities under adequate supervision.*

CASE 2: Mainstreaming: urban agriculture in Ethiopia

There are several examples in Ethiopia of people with disabilities forming associations, and thus having been given access to land and water so they can make a living from agriculture. Depending on the extent of their disability they are either directly involved - often with some help from family members or from each other - or they have taken up a more managerial role.

A new, promising example is the engagement of individual people with disabilities in urban agriculture - both in Addis Abeba and Agaro, aided by the Cheshire Foundation. Selected persons are helped in making a business plan and accessing a loan as per their need and eligibility.

In Addis Ababa, the capital of Ethiopia, the foundation has supported 40 persons to enter urban agriculture (such as home gardens) and animal husbandry by helping them access loans. The beneficiaries also receive business and agriculture training by local agriculture institutes. In four years, almost all of them had paid back the loans and were actively pursuing their enterprises. Similarly, in Agaro, a small town in Oromya State, 18 people with disabilities entered such businesses. A group of farmers with disabilities decided to get engaged in irrigated agriculture

22. Schistosomiasis is a water-borne disease and is caused by trematode worms. As part of the life cycle, these worms invade snails living in streams and ditches and, after metamorphosis, produce stages that invade vertebrates venturing into the water. Humans are prompt victims of schistosomiasis that, like river blindness, is a chronic disabling disease. There are many other waterborne diseases, with potentially disabling consequences.



Figure5: Examples of inclusive urban agriculture in Agaro and Addis Ababa, Ethiopia.

in the dry season. They undertook to divert water, and dig and clean the canals for watering their crops. The work was strenuous, but they reported that they could manage to do it despite their disabilities (in their case all of them physical). When they could not, they were helped by their families.

Conclusion: *Urban agriculture opens mainstreaming opportunities for individuals with disabilities.*

CASE 3 Adjustment: experience of people with disabilities involved in fishing and agriculture in Cameroon²³

Virtually everywhere in rural Africa, agriculture is the main source of income and livelihood for people with disabilities. However, within the agricultural value chain, there may be scope for specialised roles them. In a rural development programme in Cameroon, fishing turned out to be a main source of income for this group. People with post-polio paralysis would fish sitting in boats. As part of the process, they would also swim which helped increase their mobility. In fact, the fishermen group formed by people with disabilities was very successful.

23. Source: personal conversation with Henk van Apeldoorn.

In the project, people with disabilities were disadvantaged compared to their neighbours when it came to crop cultivation. It was more tiring for them to harvest the millet and to fetch water. Sometimes, people with disabilities were helped by family members or were offered tricycles by local or international NGOs. However, when an NGO offered help to the group of people with disabilities, they asked for a clubhouse where they could store the millet. Their request was driven by their desire to block the traders' monopoly on local market that use to buy crops at the time of harvest and sell them just before the new harvest. By having the clubhouse, people with disabilities had the opportunity to sell crops throughout the year, in particular during food shortages in the village when they could increase the prices.

Conclusion: *Disability can be an opportunity: people with disabilities appeared to be more successful fishermen. People with disability can be creative, entrepreneurial people with a commitment to achieve better than their non-disabled peers. It thus seems logical to ensure that these people benefit from mainstream development as much as others do.*

CASE 4 Adjustment: farming by the elderly in Shanxi province, China

In China's Shanxi province, poverty is concentrated in the hilly rural tracts, where farming is done almost exclusively by people aged 60 or above. At the same time, there is much potential to expand farming as, in contrast with the lowlands, water resources are not overused. What is important is to introduce systems with high water productivity (measured as monetary output per unit of water) that expand the range of cropping options in these areas and take into account the age composition of the rural population by reducing the need for hard physical labour.

Xi County is one such area in Shanxi. It ranks among the 35 poorest counties in China, with many living below the poverty line. Xi county has a climate that is suitable for agriculture and in particular for the cultivation of high value fruits like the special 'golden pears', apples and apricots. However, production is constrained by the dependence on variable rainfall. Irrigation is limited, with farmers often resorting to irrigation by bucket from local water points. However, given the relatively old age of farmers there is not much that can be achieved with such methods.

A pilot project was developed in Quayan village that counts 120 households and 514 people. The village has around 180 ha of arable land, used for corn, millet, sorghum, beans and potatoes and cash crops (in particular pears, herbs



Figure 6: Developing horticulture in the Loess Plateau (PRC) using spring drip systems

and oilseeds). Under the demonstration project, a so-called 'spring system' was developed to cover over 15 ha (serving 52 farm households). The system consisted of 0.8 mm diameter supply pipes feeding a circular pit excavated around a single fruit tree. The pilot in Quyan village has received a very enthusiastic reception by local farmers. The piped micro-irrigation 'spring' system makes it possible for the mainly aged farm labourers to grow irrigated orchards - doing away with the earlier system of carrying water by bucket that was clearly unsuitable. It also provides the basis for the development and expansion of the highly promising cultivation of the 'golden pears' in Xi County that was had not been possible

due to lack of farming methods appropriate to the age composition of the agricultural labour force.

Conclusion: *Introduction of a new micro-irrigation technology removed the barrier to the productive inclusion of the elderly and enabled highly productive farming in the uplands of Shanxi.*

5 Way forward

One billion people globally suffer from various levels and forms of disability. Not only do they suffer from their impairment but also often face discrimination in their daily lives. As a result, many are isolated within their communities and there is an economic ripple effect on their families. Increased poverty for people with disabilities is linked to barriers - attitudinal, environmental and institutional- they face in their lives. This is then compounded by the lack of services and opportunities available to them.

There appears a large knowledge gap between the actual and potential contribution of people with disabilities and the elderly to agricultural production. The gap also exists with respect to what we know about the scope, opportunities, costs and benefits of including people with a disability and the elderly, different ways of ensuring inclusion, and the expertise required²⁴.

Moreover, the variety of definitions of disability and inconsistent information gathering have also led to a gap in reliable global disability data. This has hampered the ability to evaluate need for and progress made towards incorporating the requirements of people with disabilities and the elderly into basic services, opportunities and development programmes, which deters governments and organisations from working in this direction. This potentially keeps millions of people with disabilities from receiving the facilitation they need²⁵. Additionally, even though socio-economic impact assessments and monitoring are pretty much standard now in irrigation and agricultural projects, data is hardly ever collected and analysed in disability disaggregated formats (like they are for gender for example); nor are (organisations of) people with disabilities generally consulted or involved in project design or feasibility studies.

It is our conviction that in many cases this inadvertently makes people with disabilities and the elderly worse off. Agricultural water development and management can create additional barriers and challenges. However, negative

24. Bruijn, P., Regeer, H., Cornielje, H., Wolting, R., Veen, S. van, and Maharaj, N. (2012). *Count me in. Include people with disabilities in development projects.*

25. *People with disabilities 'simply don't count' in many developing countries* (2014, October 23) Retrieved from: <http://www.theguardian.com/global-development/2014/oct/23/people-disabilities-dont-count-developing-countries-lynn-featherstone>

effects can also be mitigated, or even turned into new opportunities that benefit both individuals with disabilities, the elderly, and their families and society as a whole. The case studies in the previous section present some examples of this. With people with disabilities and the elderly making up a substantial share of the total population, and heavily overrepresented among the poorer segments in society, ensuring their effective participation is essential to eliminating or at least reducing extreme poverty. This will most likely be proposed under the Sustainable Development Goals that are currently being drafted.

Thus, to enable full participation of these vulnerable groups, action is required during the subsequent phases of the project cycle, aimed at:

- Prevention of disability;
- Including people with disability in mainstream agricultural developments;
- Adaptation of agriculture, horticulture and livestock farms to the capabilities of people with disabilities;
- Ensuring access to land water sources;
- Linking with and referral to specialised medical and therapeutic rehabilitation services to ensure that specific problems and needs can be addressed;
- Offer training, preferably mainstream services but where needed specific vocational training for people with specific disabilities.

The results may include substantially enhanced physical and psychological wellbeing; increased productivity; labour and income generation opportunities; financial gains for individuals and their families; and overall economic benefit to the society as a whole. Ultimately these actions will lead to acceptance, appreciation of the elderly and people with disabilities, as well as a more inclusive and accommodating society.

Despite the fact that people with disabilities and the elderly constitute a substantial part of the population, empirical data on the obstacles they face and the opportunities that agricultural water management can provide appears to be lacking. There is scarce evidence of programmes that have explicitly aimed at enabling their participation in agricultural water management. Where such efforts have been made, they were mostly special, small-scale projects.

Following the case studies presented here, it is necessary to upscale the discussion and at the same time experiment with interventions known to have worked. Each of the cases studies presented focuses on one or more of three categories or tracks of intervention that we have identified:

- **Prevention:** Some diseases such as Malaria, Schistosomiasis, Japanese Encephalitis, River Blindness, and Trachoma are strongly correlated to water management. Water contamination (natural or human made) can lead

to disabling diseases (i.e. long term exposure to drinking water with high concentration of arsenic or fluoride). Agricultural interventions and water quality checks are available to help control the spread of water-associated, vector-borne diseases. Available techniques include filling and draining small water bodies, environmental modifications, and alternate wetting and drying of rice fields. Across Africa, intermittent irrigation in rice fields has been shown to significantly reduce the density of malaria vectors while still maintaining yields, saving water and reducing methane emissions. Control measures are context specific. For example, where cattle are present, they can naturally divert malaria mosquitoes away from people (since cows do not get infected). Fluoride and arsenic intake reach human beings also through food. For this reason, it would be ideal to make water-quality checks and, when possible, apply arsenic and fluoride filters at the field level (and not only at the drinking water points).

- **Mainstreaming:** Strategies to include people with disabilities in agricultural water management can be incorporated at all stages in the project cycle (from planning to operation and maintenance). These strategies can aim to reduce physical and institutional barriers. For instance, during the planning phase of a project, it is possible to include people with disabilities and stakeholders working with them in the social screening and assessment. Compliance with regulations ratified by the government, NGOs and water practitioners related to people with disabilities and the elderly should be enforced. During the design and construction phase, people with disabilities should be able to review and comment on the design to ensure accessibility, allowing them to visualize the possible obstacles that they might encounter after the irrigation development. During construction, people with disabilities can be included as contracted or free labour, depending on modalities agreed upon. Besides construction, they can be supported to make projects a success by assisting them to take up roles in management (including those in water users' organisations), processing, quality control and trade. Inclusive communication strategies can be used within water users' organisations and elsewhere. Apart from the above interventions focusing on physical and institutional barriers, it remains of utmost importance to focus efforts also on influencing attitudes. It is so often the prejudiced attitudes and practices that exclude people with disabilities from mainstream developments.

An increasing number of countries provide safety nets to poor people with disabilities and their households, either through targeted programmes or more commonly through general social assistance schemes. While systematic evidence is lacking, anecdotal evidence suggests that people with disabilities and the elderly may face barriers to accessing safety nets when, for example, information is inadequate or inaccessible, when welfare offices are physically inaccessible, or the programmes' design

features do not take into account their specific needs. However, in many cases, these safety nets may provide ample opportunities for financing adjustment or mitigation measures especially when eligibility criteria refer specifically to disability. Sometimes, quota may be set for people with disabilities for employment/ engagement in the implementation of works.

- **Minor and Major Adaptation Measures:** Agricultural water projects affect the environment and the landscape, and may create additional barriers for people who have physical disabilities or mobility issues related to age. In such cases, interventions for enablement can include minor or major adaptation strategies, which can reduce barriers and improve access to water for agricultural use. For instance, people with mobility issues can benefit from development of micro-irrigation systems. Small-scale transport systems, small-scale mechanisation, better lifting gears and harvesting equipment can be adopted in water projects so they can be easily accessible to all.

In many cases, the additional costs involved can be minor, and can often be offset by the financial, economic and social gains. With the United Nations Convention on the Rights of People with Disabilities coming into force, the above may no longer be a choice, but an obligation for the water management sector are large. Based on the arguments built through this position paper, we strongly recommend systematic screening of the possible negative effects and potential positive interventions related to optimisation of agricultural water management projects for people with disabilities and the elderly in both the public and private sectors. We also advocate greater emphasis on affirmative action and capitalising on the opportunities offered by disability and age inclusive agricultural water management to achieve higher productivity and greater food security.

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February 2015

