

The Relevance of Small-scale Irrigation in the Pastoral Regions of the Horn of Africa



Pastoralism in the Horn of Africa is currently experiencing intensifying pressures resulting from human and herd demographics, environmental change, contested natural resources, livelihood impoverishment and political marginalization. Some of these changes may threaten the very future of pastoralism in modern economies, at least for the poor. On the other hand, new adaptive responses to the challenges facing pastoralists are taking place, particularly with respect to markets. Furthermore, mobile pastoralism is an efficient system of natural resource management in the arid grasslands. How should

governments and civil society (including donors and the voluntary sector) respond to the bad and the good news? They face priority choices that involve major trade-offs between economic activities. Among these constantly shifting and competing choices, and especially relevant to organizations seeking to intervene through poverty-reducing projects, is a strategy to promote crop farming, small-scale irrigation in particular. This may offer a form of productive diversification for pastoral peoples, especially those who find that their livestock-based production system is no longer viable.

The Oxfam-led Regional Learning and Advocacy Project (REGLAP) is a consortium project that aims to promote resilience among vulnerable dryland communities in Uganda, Ethiopia, and Kenya through policy change and practice. The project is currently funded by the European Commission's Humanitarian Office's Drought Risk Reduction Action Plan (DRRAP). REGLAP has been in existence since 2008, funded by ECHO, first as the Regional Pastoral Livelihood Program, to strengthen the evidence base for support for pastoral populations, and later as the regional learning and advocacy program for vulnerable dryland communities.

This study, commissioned by REGLAP, aimed to review available evidence concerning the potential for expansion of crop agriculture, as an alternative or complementary strategy to pastoralism, in arid and semiarid areas of Kenya, Ethiopia, and Uganda (large- and small-scale irrigated and rainfed), in order to promote sustainable and resilient livelihood. These were to be weighed against other livelihood support options in order to inform REGLAP's own advocacy position as well as those of Oxfam and other NGOs, especially around the IGAD-led Ending Drought Emergency plans. Research gaps and means of filling them were to be suggested. Recommendations for advocacy and practice in promoting crop agriculture in relation to other investment priorities would be made.

This article, through an overview of literature and experience gives, government, NGOs, private sector partners and REGLAP the evidence base for policy and practice on development in pastoral regions of the Horn of Africa, with particular reference to small-scale irrigation. The 'pastoralist's dilemma,' whereby the amount of rangeland that is available is considered to be insufficient to support enough livestock to provide livelihoods for a fast-growing population, is being exacerbated by the loss of rangeland (especially valuable riverine pastures) to appropriations for commercial farming and especially irrigated plantations. Many severe droughts have caused high mortality and the intervals between them have not permitted herd reconstitution. There are increasing numbers of destitute pastoralists with few or no surviving livestock.

This is a complex system dynamics containing many elements. Singled out among environmental variables are scarcity and variability of rainfall and water resources, which are at the root of uncertainty experienced by human communities, themselves

growing rapidly in number (with accompanying migration and urbanization). Far-reaching land use change reflects unprecedented pressures on the land from livestock, farmers, corporations, and governments, transforming ecosystems and driving degradation in many areas. However, urbanization and international trade are encouraging increasing participation in markets: those for inputs, outputs, land and labor, resulting in the diversification of household livelihoods. Consequently, the investment landscape is changing rapidly as dryland resources are revalued upward and external actors increase their involvement. The dynamics of the human and biological systems thus pose a threat but also offer opportunities, one of which is irrigation for the markets.

The droughts of the past decade have helped to focus policy directions in the region, both at the international level and in national policymaking. In general, there is some movement toward a coherent policy toward pastoralism that recognizes the value of the systems rather than seeking to replace them. This is apparent in the African Union's Policy Framework for Pastoralism in Africa and COMESA's Policy Framework for Food Security in Pastoral Areas under Pillar III of the CAADP. IGAD's drought disaster and sustainability initiative supported country planning papers for Ethiopia, Uganda, and Kenya. These statements, which sit within an existing structure of national policies and institutions relating to the agricultural and water sectors, climate and food security programs, vary in tone from more centralized (Ethiopia) to decentralized (Kenya). Kenya has recently enacted its National Policy for the Sustainable Development of Northern Kenya and other Arid Lands. Development is the ultimate answer to poverty and hunger in the drylands, but many issues of local ownership, participation, and empowerment remain to be addressed.

Three policy pathways are available to governments and development agencies in the drylands of the Horn of Africa:

1. Promotion of crop agriculture, especially small-scale irrigation;
2. Continued support for pastoralism, albeit in new forms; and
3. Facilitating income diversification (including migration).

This article is drawn from a wider analysis of the strengths, weaknesses, opportunities and constraints of these three options. The first (which is the main focus of this study) offers increased value per hectare under irrigation. Ex-pastoralists take up irrigation, retaining secondary livestock interests. These agropastoral systems reap the advantages of diversification and a reduced risk of food insecurity. However, constrained by few animals, small holdings and shortages of capital, they may have exchanged one poverty trap only to enter another in the longer term. Much irrigable land remains. However, irrigation needs considerable investment, including inputs, technologies, services, and markets. Expansion, though certain to occur (spontaneously even if not promoted by policy), will need investment and adaptation. The situation varies from country to country. Technologies are available, models for investment and cost recovery have been tried, and attention given to agropastoral transitions. Ethiopia prioritizes large-scale schemes, whereas Kenya has favored decentralized solutions, with public-private partnerships and other innovative financial approaches. There is urgent need for more data and for economic studies of comparative advantage, cost effectiveness, and mitigating the potential negative social and environmental consequences of these attempts.

Small-scale irrigation

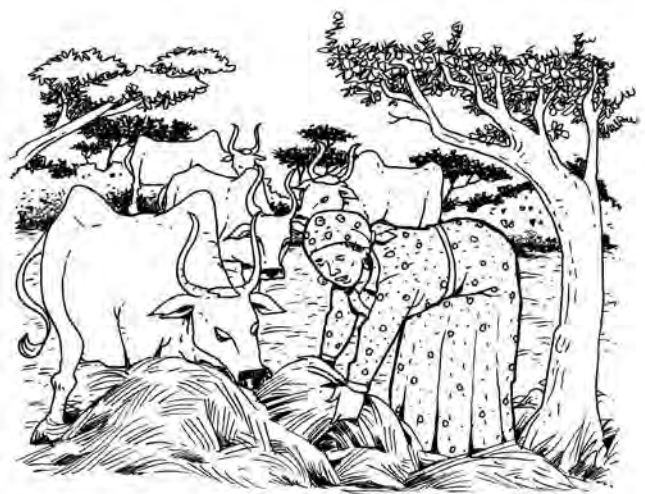
From the evidence so far reviewed, it is clear, in so far as we may generalize across the huge diversity of East Africa, that among crop agriculture options, only that of small-scale irrigation offers some scope for a transformation of mobile pastoralism, as an alternative to, or complementary with, livestock production. However, while there are considerable potentials for expanding irrigation, these potentials may still not be equal to the task of providing livelihoods for large ex-pastoral populations at improved living standards. The patchy success of many schemes shows that additional investments besides irrigation infrastructure are required, including access to improved seeds (for high-value cultivars), fertilizer and other inputs, training, maintenance services and farmers' marketing organizations (You *et al.*, 2011 Headey *et al.*, 2011).

Two key questions need asking with respect to small-scale irrigation as a solution to the "pastoralists' dilemma:" first, is there scope for expansion of the irrigated area? second, what can be learned from

project experience about the economic costs and benefits of small-scale irrigation? At the country level, it suffices to say that abundant potential exists, even in Kenya where 85% of the land area is arid. But, at the ecological level, can this potential meet the needs of pastoral populations? According to calculations, 2.2 million ha of irrigable land, divided equally among a pastoral population of 19.3 million, could provide an average of 0.69 ha per pastoralist household in the Horn of Africa (Sandford, 2013). However, this average hides huge differences between countries (1.25 ha for Ethiopia and 0.23 ha for Kenya). The assumptions must be that the 'pastoral population' will continue to grow, if more slowly, and, if riverine pastures are brought entirely under irrigation, mobile pastoralism as we know it will be mortally wounded.

Answering the second question is equally ambivalent, as few analyses have been carried out. Sandford (2013) reports on three 'pastoralist-related' irrigation schemes in Kenya and Ethiopia, with widely divergent cost levels and output values. He concludes that (excluding the Kenya example, which is in Turkana) 'the level of net benefits that can be achieved on pastoralist-related schemes is broadly compatible with the level of capital costs actually incurred in installing the irrigation systems', provided that any opportunity costs of land and labor are ignored. This may be justified because of the low returns to alternative land uses (i.e., grazing) and non-agricultural use of labor.

That small-scale irrigation makes economic sense is confirmed by the vitality of the private sector in such areas as the Wabi Shabelle River and the Mandera Triangle. It is estimated that only 2.4% of irrigable land is under irrigation in the Somali Region of Ethiopia, of which about 70% is under 'traditional'



irrigation technologies such as spate irrigation, controlled or uncontrolled flooding, lift irrigation using buckets, and gravity-fed canals.

In Kenya, a strong demand for horticultural products (including exports) is driving a 'new frontier' in small-scale irrigation, based on the use of low-cost technologies, wholly or partly made in the country. The technologies include rainwater harvesting, bucket irrigation, gravity fed sprinkler and drip, treadle and pedal pumps, rope and washer, motorized pumps, wind power, and small earth dams. Purcell (n.d.). Small-scale irrigation uses an estimated 50,000 ha; the total irrigated area is 80,000 ha of a potential area of more than 300,000 ha. The Ministry of Agriculture has a target of 1.2 million acres over 5 years (Daily Nation).

Significantly, small-scale irrigators in Kenya raise their own capital from private savings, attracted by good profits. Compared with farm incomes from rainfed land, which average less than US\$750/ha, irrigated land can produce two-three crops a year worth US\$1,400 (snow peas, French beans), US\$450 (kale) or US\$600 (onions). Such opportunism among farmers is not new and accords with the findings of local district studies in semiarid Machakos and Makueni districts (Tiffer *et al.*, 1994). It may be noted that the Akamba menfolk were themselves semi-mobile pastoralists before the colonial period. Farming, which consisted of hand-hoeing and shifting cultivation, was undertaken by women.

Very little attention is given in macro-scale planning proposals to the legion of issues surrounding small-scale farmers' participation in irrigation schemes. Studies at the project level are infrequent. One exception, a study of crop farming along the Wabe Shebelle River in the Somali Regional State, investigated three of some 18 'asset-building groups' that were set up in an earlier project (USAID, FIC, TU 2010). Each had about 50 farmers with shared pumps. From an examination of scheme performance and intended or actual benefits, it was concluded (disappointingly) that, when compared with pastoralism, small-scale irrigation may not remove risk. Beneficiaries had reverted to individualized operations and preferred the indigenous land-sharing and pump-renting agreements. Instead of helping destitute widows, the scheme was supporting experienced irrigators who had benefited from earlier projects. A great many technical issues were found to impact on performance. Diversity of situations and weak 'ownership' indicate that irrigation

should be planned on a case-by-case basis and with full stakeholder participation from design to implementation.

Given such complexity, it is unlikely that small-scale irrigation can be effectively expanded by a blue-print at a macro-scale. A guide to planning and managing small-scale irrigation schemes has been provided by FARM-Africa (Carter and Danert, 2006).

But where interventions fail, private enterprise seems to flourish. In some major river valleys of the Somali Region, irrigation is already considered to exploit most of the potentially irrigable land, based on small holdings, diesel pumps, hand labor and sub-optimal fertilizer treatments—on a 'low input – low output' basis (Devereux, n.d.). Pastoralists are said to be driven into farming by their declining livestock holdings and by shortages of grazing land. They tend to accord low status to farming. The labor requirements of year-round irrigated farming are not compatible with the needs of mobile pastoralism, except for large families. But many Somalis, nevertheless, have recently negotiated access to irrigable land and water adjacent to the pre existing schemes on the Shebelle River, and the privatization of land for irrigation has led to disputes (Gomes, 2006). Its rising value also attracts speculators and entrepreneurs from the towns. The cultivated area in the state increased threefold between 1973 and 2010. Security of land tenure is an urgent issue for (ex-) pastoralists, many of whom do not expect to return to mobile pastoralism.

Crop agriculture, to reduce vulnerability to drought, must be rooted in sustainable resource management and generate a level of production that satisfies the material and social needs of each family. Being sedentary automatically extends the pastoralist's agenda from livestock into farming, education, health, and market access for income diversification. Two schemes for Kereyu agropastoralists in Fentale (in the Awash River Basin, Ethiopia) make use of irrigation water on the margins of the Metehara sugar plantation (Akloweg, 2013). They accommodate 600–700 beneficiaries on land, formerly communal rangeland, allocated by the elders at 0.75 ha for a family. While their diminishing herd are grazed collectively on rangeland at 2 days' distance, the communities occupy new housing in settlements with a school, administration, and unsurfaced road to market (at about 15 km). New income streams and especially the ability to sell two or three crops at different times of the year are seen

as advantages. However, an annual fee is payable to offset the capital costs of the schemes. Besides the management of land and water resources (managed by water users' associations), issues of market demand and linkages (motor transport for produce), fertilization (cost), technology (scarcity of capital funds), education (inability to sustain children's registration beyond primary level), health, and income diversification are concerns. Staff and skill shortages have affected efficiency (Flintan n.d.). Poverty still means a lack or shortage of livestock, but while irrigated farming has reduced the risk of food insecurity, the inability to acquire additional irrigable land has raised fears for the next generation, while the scope for income diversification is constrained by education and travel costs.

Schemes can also be adversely affected by power shifts and conflict. Pastoralists displaced by the Shifta rebellion in the 1960s took up irrigation in the Tana floodplain with government support, but when this was removed, the farms languished until renewed support was forthcoming. Many used farm incomes for restocking and went back to mobile pastoralism. The crucial difference was and still is marketing access and costs (Farah *et al.*, 2003). According to informants, sustainable irrigated cropping in the Garissa area depends on the removal of compulsory payments to the scheme revolving fund, better transport to market, resolving the competition for labor between farming and herding, giving equal opportunities to women (whose participation in farming is crucial), ending the inefficient underuse of field holdings, and improving efficiency and equity in water management.

Small-scale irrigation is not yet a panacea for the problems faced by pastoralism. But the values of snow beans, French beans, kale, and onions in Kenyan markets illustrate increasingly buoyant markets, and the 'boom' in small-scale irrigation where urban markets are within reach, suggest positive trends in contrast to the negatives of the "pastoralists' dilemma." However, small-scale irrigators may compute their business strategies (for example, by undervaluing family labor), the widespread success of farmers in gaining access to growing fruit and vegetable markets should eventually open the door to agro-pastoralists in more remote places. Even in a remote place—such as the Mandera triangle on the borders of Kenya, Ethiopia and Somalia—irrigated fodder production for the market, which is the local transborder traffic in livestock, is increasing incomes, if not necessarily

those of the poorest (ELMT, 2009). Success also depends on maintaining water and seed supplies (ELMT n.d.).

Irrigation schemes need capital. Cost recovery problems have shadowed small-scale irrigation schemes supported by external donors or the government, with top-down management and unpopular land alienation. New models of capitalization are required. Experiments in new financial and management packages have begun to yield lessons in Kenya (Gikuchi, pers. commun.). A public-private partnership leases common or community trust land and shares capital costs between private investors and local farmers. A company manages the scheme. As profits accumulate, the leased plots are taken over by small-scale farmers, so the land stays with the community. Other innovative financial packages have been developed and experimented in Kenya (Grimm and Richter, n.d.).

Private investors may have local connections and be prepared to abandon profit maximization in favor of the social rewards of philanthropy. 'Impact investments' that aim at social as well as economic benefits - for reasons other than profit maximization - are gaining ground as a new class of financial assets (Morgan, 2010). If the ASALs are to achieve economic parity with more humid zones, new opportunities for investment are required (Pipal Ltd., 2011). This thrust has been underlined in a recent report on global drylands (EMG, 2011).

However, two caveats are in order (Avery, 2010). The first is that small-scale irrigation is necessarily located as close as possible to the water source. But in Kenya, where riverbank flood recession farming is traditional, cultivation disturbs soils and increases erosion, and the Water Act forbids 'tillage' within the riparian zone. The implications of water legislation are unclear, since it appears to be widely disregarded.

The second caveat is that conflicts may arise where schemes are set up in the territories of wildlife populations. Damage may be caused, crop losses incurred, and fencing proved prohibitively costly to smallholders.

Critical factors in the success of small-scale rainfed or irrigated agriculture include:

- ◆ secure rights of access to land

- ◆ high-value and innovative crops
- ◆ integrated livestock enterprise
- ◆ infrastructure in place
- ◆ accessible markets
- ◆ water harvesting, efficient management
- ◆ well-designed gravity systems (ILRI)

Conclusion

It is suggested that we may be on the cusp of a significant transition to growth in the small-scale irrigated sector. Enabling a transition will be the challenge for the promotion of good practice and for innovative research. Good practice in small-scale irrigation should include (1) planning that recognizes system interactions, reconciles contested claims to resources, and follows democratic principles; (2) freedom of choice in matters relating to household livelihood strategies; (3) recognizing and realizing the complementary benefits of livestock; (4) the conservation of soils and water; (5) educational enablement of individual life chances; fully participatory irrigation development and regulation; (6) allowance for multisectoral livelihood strategies; (7) exploitation of complementarities between production systems at the local level; (8) enhancing livelihoods and better life chances for individuals through education; (9) extension as a way of building human capital; (10) action research and innovation relevant to small-scale production units; and (11) provision of economic incentives for micro-investments. A framework for action is proposed with technical, economic/financial, and policy/institutional agendas.

Source

This article has been drawn from a section of a wider study. Refer to the following for the original full article: *The place of crop agriculture for resilience building in the drylands of the Horn of Africa: an opportunity or a threat?* By Michael Mortimore. June 2013. Regional Learning and Advocacy Programme for Vulnerable Dryland Communities. GROW. Food. Women. Planet. mike@mikemortimore.co.uk

References

- Avery, S.T. (2010), *ibid.*; (2012), *ibid.*; Personal communication
- Aklweg, N (2013) Notes from the field visit made to the irrigation schemes in Fentale Woreda, 28 January, 2013
- Carter R. & Danert K. (2006), FARM-Africa Ethiopia: planning for small-scale irrigation intervention. Working Paper series 4, FARM-Africa
Daily Nation, Saturday 8th June
- Devereux S., *Ibid.* AWG (n.d.), Irrigated and rain-fed farming in Somali Regional State, Ethiopia: lessons learnt. Agricultural Working Group
- Economic/financial group, ILRI Workshop on the Appropriateness of Crop Agriculture, February 6, 2013
- ELMT (2009) Technical Brief. Fodder production: experiences and lessons learnt by VSF Suisse; Seif Maloo, Pers.com.; ELMT RCU (2009), Monitoring Visit Reports for VSF Suisse: Mandera and Garbatulla
- ELMT RCU Monitoring Visit Reports for CARE Somalia: DCFS, Dollo
- EMG (2011), Global drylands: a UN system-wide response. UN Environment Management Group Nairobi: UNEP
- Farah K.O., Nyariki D.M., Noor A.A., Ngugi R.K. & Musinba N.K. (2003) The socio-economic and ecological impacts of small-scale irrigation schemes on pastoralists and drylands in Northern Kenya. *J.Soc.Sci* 7/4: 267-274
- Gomes N. (2006), Access to water, pastoral resource management and pastoralists' livelihoods. Rome: Livelihood Support Programme, FAO
- Grimm, J. & Richter, M. (n.d.), Financing small-scale irrigation in sub-Saharan Africa. Part 2: Country Case Study Kenya. GTZ/ The World Bank
- J.P. Morgan (2010), Impact investments: an emerging asset class.
- Pipal Ltd. (2011), Northern Kenya Investment Fund Overview Report. Pipal Ltd Nairobi
- Purcell R. (n.d.), Potential for small-scale irrigation in sub-Saharan Africa: the Kenyan example. FAO and The World Bank; Avery S.T. (2010), Coastal Rural Support Programme, Water Master Plan Study. Aga Khan Foundation
- Sandford, S. (2013) Pastoralists and irrigation in the Horn of Africa. Time for a rethink? In: Catley, A., Lind, J., & Scoones, I., Pastoralism and development in Africa. Dynamic change at the margins. Earthscan, 47-56
- USAID/ Feinstein International Center, Tufts University (2010), Impact assessment of small-scale pump irrigation in the Somali Region of Ethiopia