

Zinc Case Study

Madagascar

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Disclaimer

Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the key informants, thought partners or reviewers.

I. Context

With over 20M inhabitants living on ~580,000 km of land, the francophone/Malagasy island nation of Madagascar is one of the more populous nations in sub-Saharan Africa (SSA). Its population is similar to that of the broader SSA region in that it is skewed young and has a moderately high fertility rate. With a life expectancy of 66.7 years, over 10 years higher than the SSA average of 54.4 years, Madagascar's population is surprisingly health despite significant geographical/ infrastructure barriers, poverty and waves of political unrest. Its PPP-adjusted GNI per capita of \$824 is less than half that of the average for SSA (\$1,966), suggesting that the country is both poorer and healthier than many of its African counterparts (UNDP, 2011). Madagascar's population is currently predominantly rural (70% in 2010), but the rate of urbanization is substantial at 3.9% rate of change per year from 2010-2015 (Central Intelligence Agency, 2012).

Table 1: Key contextual information about Madagascar

Statistic	Estimate for 2011	Source
Total population	21.3M	(UNPD, 2011)
U5 population	3.3M (2010)	(Liu, et al., 2012)
Fertility rate	4.5 (mean # kids/ woman)	(UNPD, 2011)
Median age	18.3 years	(UNPD, 2011)
U5 mortality rate	57.5 / 1,000 live births	(UNPD, 2011)
HDI ranking	151 st / 187 countries	(UNDP, 2011)
GNI per capita	\$824	(UNDP, 2011)
Life expectancy	66.7	(UNDP, 2011)

The country is divided into 6 provinces which in turn are divided into 22 regions, 111 districts and >1,500 communes. Health services are provided at each of these levels, with the majority of primary care occurring at the lowest level. Infrastructural challenges are some of the most acute in SSA- with a total area of ~590K km, Madagascar is nearly twice the size of Arizona but with <10K km of paved roads, making many rural populations relatively inaccessible (Central Intelligence Agency, 2012).

In the 1980's, to provide health services in remote regions of Madagascar, the national health program dispatched 1,500 health aides to remote sites to establish what are now called Primary Care Centers (*centre de santé de base*, or CSBs) that would provide basic health services to communities. By 2004, 3,000 CSB's with either a health aide or nurse were operating, each serving a population of 10,000 (World Bank, 2009). However, this network only reaches 60-70% of the population; many people continue to travel >10km to get treatment (IRIN, 2012). Given the frequency with which cyclones hit and destroy infrastructure, including health facilities, it would take concerted investment to enable the entire population to consistently have access to health facilities- in 2003 the World Bank estimated the Madagascar's communes received <15% of the funds they needed to deliver on their health services (\$0.8 out of \$6.9 per capita), even including donor commitments.

Since its independence in 1960, Madagascar's natural disasters and periodic political turmoil have had a severely negative impact on its health programming. Between 1980 and 2010 alone, Madagascar suffered through 35 cyclones and floods, five periods of severe droughts, five earthquakes, and the rise and fall of three republics (World Bank, GFDDR, ENV Climate Change Team, 2011). A select set of events from the past ten years, and their impact, illustrate the major contextual challenges Madagascar faces in improving their health system:

- **Late 2000:** Madagascar was struck by three cyclones in a three-month period, severely damaging 315 health facilities in two of the six provinces. 300K people were in need of emergency relief, resulting in the reallocation of government and donor funds.
- **2002:** As a result of December 2001's highly contested Presidential elections (which resulted in an 8-month standoff), many public services were discontinued. This resulted in an increase in the poverty rate to 73% and the extreme poverty rate at 62% of the population. The availability of basic medicines in rural health centers fell from 91% to 69%, and health service utilization declined from 50% to 36% countrywide (World Bank, 2005).
- **2009-present:** Protests over increasing restrictions on opposition press and activities resulted in Ravalomanana stepping down and the presidency was conferred to the mayor of Antananarivo, Andry Rajoelina. Numerous attempts have since been made by regional and international organizations to resolve the subsequent political gridlock by forming a power-sharing government. In the meantime, the US government refuses to recognize the new regime and cut off all foreign aid to the public sector. This resulted in the cancellation of numerous projects meant to address deficiencies in service delivery in the public sector. The country currently appears to be moving towards new elections in 2012 which may improve the situation going forward (Central Intelligence Agency, 2012). To date, this political crisis has hampered both economic progress and the ability of the public sector to provide services for its people. In 2010, health expenditure fell by 30% compared to 2009, and 214 community health centers shut down in January 2011. In 2012, health expenditure fell by another 50% (IRIN, 2012).

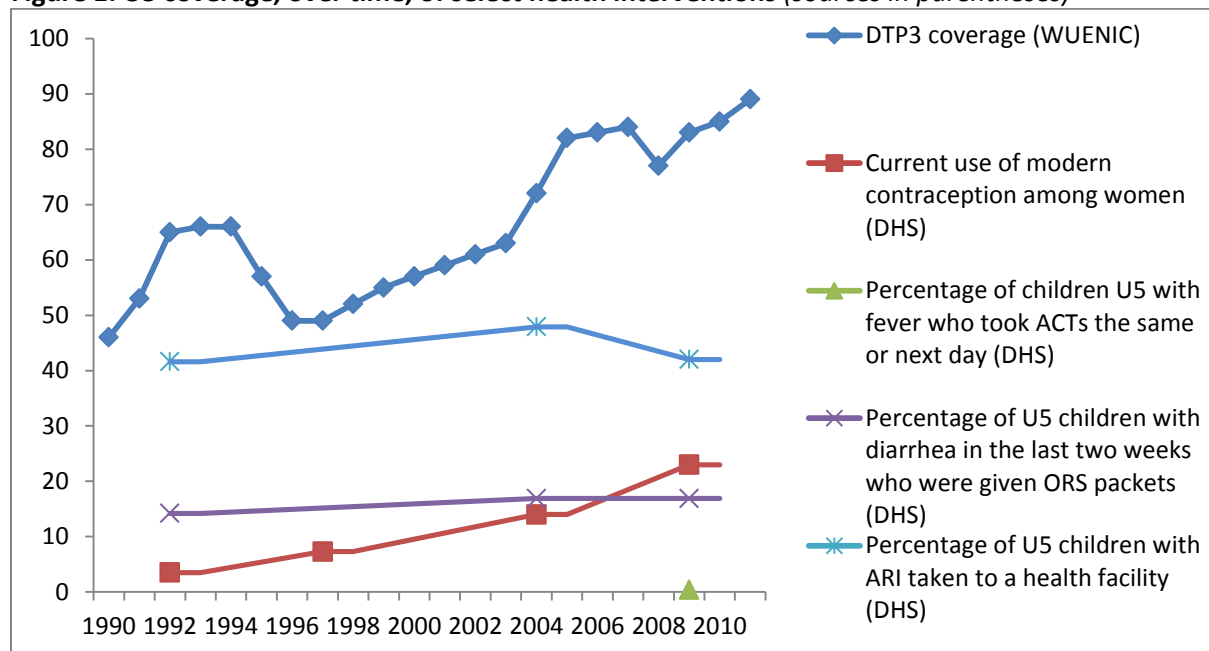
Given both the frequency and magnitude of these challenges, Madagascar is unlikely to improve on key development indicators in the very near term even with sizable investment. The World Bank invested >\$10M dollars to strengthen health facilities from 1999-2006, and because of the political turmoil and natural disasters, health access was worse at the end of that period instead of better (World Bank, 2008)

Despite poor access to health services and political unrest, over the last decade Madagascar benefited from a dramatic decline in its U5 mortality rate, from 176.2 per thousand live births in 1978 to 62.1 in 2001 (World Bank, 2012). We do not have sufficient data to definitively know whether diarrheal mortality declined, but a 2008 government survey noted that diarrhea, was the second leading cause for consultation at health centers.

One would expect such a dramatic decline in U5 mortality to be associated with the scale-up of numerous commodities, but Figure 1 indicates an interesting bifurcation among a small subset of health interventions. Specifically, taking a long-term view and ignoring the impact of the recent conflict, immunization (DPT3) and family planning products are increasing in coverage whereas treatment interventions are stable (with the exception of ACT's- where we don't have enough information). Family planning in particular has doubled its coverage in five years based on an approach that included the following key factors (UNFPA Africa, 2011):

- Promoting country ownership of goals and outcomes
- Improving logistics systems
- Deploying user-friendly software to manage commodities
- Integrating commodity management beyond contraceptives
- Having a partner willing to fund procurement of contraceptives in crisis years (UNFPA)
- Developing a tailored strategy for the hard-to-reach and underserved populations (including outreach and community-based distribution)
- Increasing demand for contraception via media and other campaigns

Figure 1: U5 coverage, over time, of select health interventions (sources in parentheses)



Note: A two-period moving average trendline was applied to the DHS data

Before USAID's Social Marketing for Diarrhea Disease Control : Point of Use Water Disinfection and Zinc Treatment (POUZN) project efforts to scale up zinc (and ORS alongside it), Madagascar already had attempted to scale up ORS twice, once in the late 80s/early 90s via the National Control of Diarrheal Diseases Program (NCDDP) and once in the late 90s/early 2000's via the IMCI program. While both attempts made some progress on the supply side (e.g. establishing a local supplier, training of health professionals, ensuring that ORS was in stock at health facilities), demand-side barriers for ORS, enforcement of training and engagement with the private sector were neglected. This in part explains the poor ORS coverage over the last 20 years. Prior to 2008, the ORS coverage in Madagascar was less than half the global average at 16.9% according to DHS (though a 2008 PSI survey revealed a rate of only 8%).

The two principle barriers to using ORS + Zn were a) 59% of caregivers not visiting any health facility when the child had diarrhea- neither public nor private, and b) among caregivers that sought treatment at public or private health facilities, few received ORS from health facilities (USAID, 2006). The low usage was not completely a supply issue- ORS was available at 80% of sites (USAID, 2006). However, lack of provider knowledge was somewhat of a contributor- by 2006, only 60% of healthworkers had been trained in IMCI despite the fact that it had been introduced in 101/111 districts (USAID, 2006). Clearly the product was suffering from poor demand both from caregivers and from healthworkers. According to the DHS 2008 survey, ~40% of episodes of diarrhea are treated with home-based fluids or RHF, which may explain why some children never made it to the health facility and why mothers demanded a different kind of treatment when they arrived at the facility. However, limited data are available to track whether families prepare and use these interventions correctly, either in Madagascar or more broadly, so we cannot be certain of their effectiveness.

II. Approach to scale-up of ORS + Zn

In 2008, the POUZN project initiated its work in Madagascar to introduce and scale up zinc usage. Key internal and external stakeholders (e.g. donors, MoH, in-country pediatricians) endorsed both zinc treatment and the project early on, creating a favorable environment at the national level for introduction (USAID, 2006). The project had three primary funders: USAID through POUZN (\$1.5M), UNICEF (a portion of its ~\$4.9M annual budget went to procurement of unflavored low-osmolarity ORS + Zn for public sector;) and the Madagascar government (\$\$ unknown). The project will conclude at the end of 2012, at which point Madagascar will be looking for funds to continue trying to scale –up zinc.

Prior to scale-up, the regulatory environment was already favorable for introduction. The decision to register zinc as a medicine rather than a food supplement was made by the Technical Committee at the planning meeting held on October 6, 2005. During the meeting, it was also decided that zinc should be classified as a "Table C" product, which can be dispensed without a prescription, allowing for community distribution and for sale in the private sector.

POUZN worked to develop two improved ORS + Zn products for a 2009 launch: *ViaSûr* and *HydraZinc*:

- ***ViaSûr*** is a subsidized diarrhea treatment kit (DTK) that contains ten 20mg tablets of zinc sulfate, two sachets of orange-flavored ORS, and pictorial/ Malagasy instructions for low-literacy target populations. This kit was made available exclusively through rural community-based sales agents, supervised by NGOs, for the subsidized price of 500 ariary (US\$0.25) for poor, rural areas at the request of USAID. *ViaSûr* was initially available in 225 communes across 45 districts where diarrhea incidence was known to be high.
- ***HydraZinc*** contains the same ten 20mg zinc sulfate tablets, strawberry-flavored ORS, and pictorial/ French instructions. It is distributed nationwide through the commercial pharmaceutical system and at rural drug counters known as *depôts de médicaments (dépôts)* at a cost recovery price of 2,000–2,500 ariary (US\$1.00–1.25), per an agreement with USAID not to subsidize the product. *HydraZinc* was positioned as a more up-scale, premium product. It was made available in all 111 districts, via PSI Madagascar's established private sector distribution network.

The development of two different products with tailored pricing and instructions reflected some awareness of different consumer segments within Madagascar, based on consumer research on willingness-to-pay and flavor preferences. However, it is unclear whether any evidence was collected to validate whether other product features (e.g. symptom relief, amount of ORS per packet) were evaluated for their ability to help increase uptake and generate demand. Additionally, these products were targeted to private sector distribution, where <1/3 of caregivers seek care (USAID, POUZN, 2010) (USAID, 2006). The public sector received unimproved ORS + Zn product from UNICEF, which was distributed across 90/111 districts.

Madagascar has no pharmaceutical manufacturing capacity to produce either zinc or low-osmolarity ORS, thus zinc was imported from Nutriset in France and the ORS was imported from a USAID-approved supplier in India by PSI. The commercial sector, while having a reasonably good wholesale distribution system, did not have a distributor who could independently import the products and market them nor adequate reach into rural areas. In addition to increasing the cost of the product, the other consequence of foreign supply was lack of reliability for the supply chain. The political unrest in 2009 caused two delays in the *ViaSûr* supply chain- the 'launch' order arrived after the diarrhea season, and the second order was delayed which severely limited the supply of *ViaSûr* in the 2009/10 season.

Provider education was managed differently depending on whether the provider was public or private, urban or rural. Within the public sector, the MOHFP did move forward with a comprehensive plan to train health clinic staff in the new standard management for childhood diarrhea using the new low-osmolarity ORS and zinc. This training was conducted much more broadly than POUZN's private sector efforts, reaching half of the staff in half of the primary health care centers- or CSBs- in 90/111 districts by 2010 (the same 90 districts that received UNICEF ORS + Zn supply). However, despite the increased breadth, only one quarter of the staff were trained and by the end of the training, <20% of public sector providers recommended zinc. Focus group discussions with CHWs revealed their overall degree of comfort with using antibiotics for diarrheal treatment. One set of community-based distribution agents (CBDs) and community health workers (CHWs)¹ further commented that they always had *ViaSûr* and ACTs in stock, but lacked the 'more useful' antibiotics medicines.

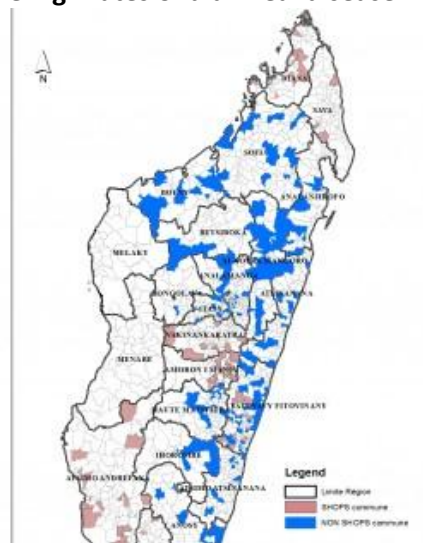
In the private sector, POUZN promoted *ViaSûr* via NGOs, leveraging their networks of community-based distributors (CBDs) who both promoted use and sold a "basket" of child health products to households within their own rural communities. This community-based distribution program was centered in 225 communes with high rates of diarrheal disease located in 45 (out of 111) districts that are active in the USAID's bilateral SantéNet2 "Champion Community" program (see Figure 2). In the SantéNet2 program, 11,000 healthworkers and their communities set health goals and are rewarded when those goals are reached. POUZN's community-based program also included a number of other NGOs outside of the SantéNet2 partners in order to extend the reach of the product as far as possible into other rural communities. This distribution system ensured that the program reached the poorest communities most vulnerable to diarrhea and provided income for the CBD. CBDs earned 100 ariary (~\$0.05 USD in May 2012) for each *ViaSûr* kit sold. By April 2010, *ViaSûr* kits were not yet extensively available in the target communities. In one control-region without zinc, a CSB doctor commented:

"What I find to be most efficient for diarrhea is a treatment with antibiotics; for instance chloramphenicol, metronidazole accompanied by charcoal tablets and medicine against spasms. That treatment is very efficient.... If I treat an infant for diarrhea and the child receives those medications, four hours after taking the medicines the diarrhea stops."

This perspective illustrates the criticality of training and supportive supervision in scale-up efforts to ensure that healthworkers understand the value of ORS + Zn.

¹ Community-based distribution agents are generally local individuals hired to distribute commodities such as ORS at a small profit to themselves, reaching districts that are inaccessible to the traditional health system. Community health workers provide primary care to local populations; Assume here that it is the CBD's who are noting the availability of *ViaSûr*, since distributors targeted CBD's and not CHW's (who presumably received the unflavored UNICEF product)

Figure 2: SantéNet2 reaches 10M people across 800 communes- POUZN intervened in ~1/4 of the communes, targeting areas that have high rates of diarrheal disease



Note: Colored areas are SantéNet2 locations; pink indicates the presence of 'Strengthening Health Outcomes through the Private Sector' (SHOPS)

Among the private sector providers serving a wealthier clientele, PSI's team of nine medical doctors (detailers) visited pharmacists and dépôts to supply product samples and provide point-of-purchase promotional and educational materials. As of 2010, the distribution network for *HydraZinc* included 893 registered pharmacies and dépôts and 377 private dispensaries, each of which stocked PSI products. Using these nationwide pharmaceutical wholesale and retailer networks, *HydraZinc* was made widely available in urban areas of Madagascar, reaching 95 percent of the country's pharmacies

Unfortunately, neither of the promotional efforts within the private sector translated into a dramatic increase in ORS + Zn recommendations. In POUZN's mystery client survey of 61 private pharmacists and dépôt staff, when confronted with uncomplicated diarrhea that did not require antibiotics:

- 46% prescribed an antibiotic
- 33% prescribed an anti-diarrheal
- 5% prescribed zinc with ORS
- 16% other

Out of the 56 vendors who were then explicitly asked about zinc, 22 (or 36 %) said they never heard about zinc nor knew anything about the product and 8 (14%) said that zinc was either out of stock or never in the pharmacies (even though PSI's retail audit confirmed 95% penetration among pharmacies). In sum, though this survey had very few participants, it suggests that the medical detailing visits did not achieve the desired results.

The marketing campaign was generally thorough and thoughtful, but delayed relative to the other interventions and only just beginning when the program evaluation commenced. Thus preliminary results were as dismal as the provider promotion outcomes, though future data may suggest greater success. Based on formative research on care-seeking behavior, communication efforts targeted both caregivers of children under five and the providers who recommend child health products (pharmacists, doctors, and community-based distributors or CBDs). In order to meet the communication objectives,

two separate messages and sets of IEC materials were developed: one to educate providers about the new protocol and convince them that ORS + Zn was as effective as the antibiotics or anti-diarrheals that they had previously recommended, and the second to introduce the new treatment to caregivers and suggest that they visit their provider for more information and/or treatment.

In rural poor areas, interpersonal communication by CBDs was one of the primary communication vehicles. The POUZN team developed a counseling card/treatment guide (algorithms for treating diarrhea, respiratory infections, and malaria) to assist in this process. In addition, four mobile video unit teams circulated through rural areas with messages focused on water treatment, improved hygiene practices and diarrhea treatment.

For the wealthier urban populations, *HydraZinc* was initially promoted via mini-launches with regional units of the Madagascar Medical Association. This was a 'stop-gap' solution to solve for the fact that political instability resulted in major barriers to launching media campaigns. Several months after *HydraZinc* became available, a mass media campaign finally commenced in April 2010 with both radio and television spots broadcast on four government-owned national and regional television and radio channels as well as three private television channels in Antananarivo and four privately owned regional radio and television channels. No formal training of providers or pharmacists took place.

The delays in marketing had a dramatic impact on the reach of the campaign. The POUZN-funded household survey showed that only 23 percent of caregivers of children under five years had heard any message on diarrhea treatment over the past three months; only 8 percent had heard about ORS in the past three months; and just 2 percent had heard about zinc in general or a specific branded message about *ViaSûr* or *HydraZinc* in the past month. While the delays in the marketing campaign likely played a role in this low impact, the rural zones were likely most drastically affected due to 1) Delays in *ViaSûr* rollout, and 2) the limited reach of news radio which is accessible to only ~50% of rural families (USAID, POUZN, 2010). While very few respondents had heard either a generic message about zinc or a specific branded message about *ViaSûr* or *HydraZinc*, those individuals who heard either a generic or branded message were much more likely to have used zinc than those who had not heard the messages. And of all of the caregivers who had ever used zinc, 100% said they would purchase and use it again.

III. Conclusion

The disappointing results of this scale-up effort (increase in ORS usage to 21%, increase in zinc usage to 4%) are not entirely unexpected given some major flaws in implementing the scale-up plan. However, these results may be understating the impact in later years because the evaluation of the most recent scale-up occurred during, not after, implementation of select components. That said, there are some key conclusions to draw from Madagascar's scale-up, in particular:

- Context played an incredibly large role in determining the degree of success or failure to scale. Madagascar's 2009 conflict resulted in reduced funding, supply chain interruptions and marketing delays. In addition, the poor infrastructure of the health system provided a 'ceiling' from the start of what was achievable, simply because large swaths of the population were inaccessible to the health system.
- Supply and demand-side interventions were frequently out of sync with each other due to delays on both sides. Though delays were frequently attributable to the above contextual factors, both the chosen 'mass media' marketing strategies and the lack of local product sourcing reduced the amount of flexibility in the scale-up program and made it less resilient against contextual complications

- Though initial research on treatment-seeking behavior demonstrated the importance of the public sector, most of the interventions continued to be designed around the private sector, in part due to political conflict which resulted in suspended funding for public sector programs. In the future, scale-up plans should include a risk assessment of whether donor funding restrictions might impede a holistic approach. Mitigation strategies could include the identification of alternative donors in order to enable countries to do what's best for their particular context
- Policymakers in Madagascar don't necessarily perceive incremental increases in ORS and zinc usage as 'failures'. One informant described the modest zinc increase to 4% coverage (estimated based on a 1,000 household survey with mix of 2 control and 8 intervention districts) as 'a success', and only admitted that it might actually be a failure when pushed on the failure to secure a local supply chain and time the marketing campaign appropriately. That said, it should be noted that the informant considered the interviewer as a potential funder, which may have caused him to feel pressured to define the Madagascar work as 'successful'

In sum, this case study supports our hypothesis that successful scale-up relies on strong, concurrent interventions across critical demand and supply-side factors. Madagascar's failure to successfully implement interventions across all the key scale-up components resulted in disappointing, incremental gains.

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Appendix 1: Evaluation of scale-up efforts across seven key components in Madagascar

Component	Degree of success (H/M/L)	Drivers of success/failure
Development of improved product (including pricing)	M	<ul style="list-style-type: none"> • Basic consumer segmentation, yielding two products with flavor improvements, co-packaging, tailored instructions and price points • Assessed willingness-to-pay and flavor preferences via consumer research • Improved products were only distributed in the private sector, where <1/3 of population seeks treatment for pediatric diarrhea • Pricing of treatment kits cited as barrier to use, particularly for the poor
Marketing campaign	L	<ul style="list-style-type: none"> • Delays in mass media campaign compromised efforts to reach caregivers • Very few caregivers advised by healthcare providers to use zinc (<3% in districts surveyed)
Regulatory change	H	<ul style="list-style-type: none"> • On Essential Medicines List, approved as Table C since 2004
Improving private provider knowledge	L	<ul style="list-style-type: none"> • Provided targeted training for 3,571 healthworkers and 600 health aids (public and private) in 225 poor, rural communes, and doctors/pharmacists in higher-end communities • Did not conduct provider research to assess major reasons why ORS + Zn not usually recommended • Despite training, a 'mystery shopper' survey found <5% recommended ORS + Zn when confronted with case of uncomplicated diarrhea- suggesting that training failed to address major barriers to recommending ORS + Zn
Improving public provider knowledge and increasing supportive supervision	M	<ul style="list-style-type: none"> • Provided targeted training for 3,571 healthworkers and 600 health aids (public and private) • Did not conduct provider research to assess major reasons why ORS + Zn not usually recommended • More public sector providers willing to recommend ORS + Zn than private sector as product available for longer in public sector, but not by much (66% still recommended antibiotics/antidiarrheals) • Providers still more comfortable/prefer antibiotics even after education on ORS + Zn
Increasing availability of supply	M	<ul style="list-style-type: none"> • Unable to source locally, resulting in delays and unfavorable pricing • Data provides mixed signals on availability

Financing of scale-up

- Project initiation phase (2009-2010) too short for realistic impact, and had insufficient investment from external and government funders
- Financing sometimes specifically tied to procurement or private sector, compromising flexibility of scale-up strategy