Learning from Somalia and Ethiopia – the NREN as a tool for Building National Expertise: A co-authorship between SomaliREN and the World Bank

Rachel FIRESTONE[1], Abdullahi Bihi HUSSEIN[2]

[1]*SomaliREN Secretariat, Industrial Road, Warta Nabadda, Mogadishu*
Tel. +252619600611; Email: abdillahibehi@somaliren.org,
[2]*The World Bank, 1818 H Street NW, Washington D.C, USA 20433*
Tel. +12024589821, Email. rfirestone@worldbank.org

Abstract:

Countries in the process of developing their ICT ecosystem often face the challenge of end users lacking the skills and information necessary for using the new technological service to its full capacity. States recovering from conflict and emerging out of long periods of isolation tend to experience this imbalance in infrastructure and soft-skill development even more poignantly as they work to expand many services and sectors concurrently. Somalia is a good example of this as its national technical capacity is too nascent to deploy national Research and Education (NREN) infrastructure without importing external expertise. Yet past development experience in-country also demonstrates that reliance on outside expertise can underemphasize local knowledge development and result in institution ill prepared to avail of the technology at their disposal at development project completion. This paper takes a comparative analysis of NREN and education-based technology project experiences in Somalia and Ethiopia aims to explore how an NREN can not only avoid this pitfall, but how the unique services it can provide in addition to connectivity can act as a tool to building out the technical skillsets necessary to support a vibrant ICT sector and competitive developments in the STEM professions across the board.

Introduction:

As emerging economies take on the global playing field, and as countries move out of fragility and conflict, communications infrastructure is a critical enabler for rebuilding and bolstering the systems constituting a transparent and democratic state.[1] Information

---

[1] See: Kelly, Tim and David Souter. "The Role of Information and Communication Technologies in Post-Conflict Reconstruction: Insights from Five Countries Building the Groundwork of an ICT Policy Agenda for Conflict-Affected Nations," *info*Dev, The World Bank Group, March 2013.

communication technologies (ICTs) are also crucial to supporting national human resource capacity to reach internationally competitive levels.[2] Yet countries in the process of developing their ICT ecosystem often face the challenge of end users lacking the skills and information necessary to effectively utilize and maintain the new technological services in the first place. Where in-country technical expertise is nascent, country governments, donors, and private sector entities often import foreign specialists to set up facilities and infrastructure, at the expense of developing local technical capacity. States emerging from conflict and long periods of isolation tend to experience imbalanced infrastructure and soft-skill development particularly poignantly as they work to expand multiple services and economic sectors concurrently.

Yet communications infrastructure geared towards supporting higher education and research institutions has been shown to help fill national level gaps in local human resource capacity.[3] National Research and Education Networks (NRENs) are a case in point as their demand aggregation lowers the price of bandwidth, while unique "middleware" services, such as Authentication and Authorization Infrastructures, and the role of a platform for value added services (VAS) such as grid computing and e-library facilities have been shown to dramatically increase the training and research resources available in-country.[4] The following research aims to use a comparative analysis of experiences in Somalia and Ethiopia to explore how, particularly in the context of currently or recently fragile states, NRENs can support the build out communications infrastructure and the technical skillsets necessary to develop the and support the ICT sector and STEM professions at the national level.

Methodology:

Using a comparative case study analysis, research for this inquiry was conducted based on interviews carried out with NREN CEOs, ICT Directors based within individual universities, NREN network engineers, employees within national level communications and education ministries, university chairpersons and other administrators, and IT and Computer Science faculty lecturers in Somalia and Ethiopia. The research also included a desk study of NREN documentation collected by Somali and Ethiopian NREN organizational bodies, respectively the SomaliREN and EthERNet. Somalia and Ethiopia were chosen as contexts for study, given the following:

- **Somalia**—a state and economy working to rebuild in the aftermath of civil war, where local skill development has thus far been too nascent to deploy ICT infrastructure without importing expertise. At the same time, contracting foreign skillsets for one-time ICT development projects at the university level has a resulted in demand for local content development of administration platforms and curricula, as well as human resource development in-country.

---

[2] See: United Nations Report on Human Resource Development, DESA Office of ECOSOC Support and Coordination, 2013, Web. <http://www.un.org/en/development/desa/oesc/humanresources.shtml>
[3] See: Barry, Boubakar. "The State of Research and Education Networking in Africa," Educational Technology Debate: Exploring ICT and Learning in Developing Countries, June 2011, Web. < http://edutechdebate.org/research-and-education-networks/the-state-of-research-and-education-networking-in-africa/>
[4] See: Foley, Michael. "National Research and Education Networks (NRENs): What they are, the case for their establishment, and NREN activity in Africa," World Bank Group draft working paper, October 2015.

- **Ethiopia**—a state that, while still deemed a fragile and transitioning economy by the international community,[5] has experienced strong and broad-based growth over the past decade.[6] In this context, Ethiopia has developed a functional NREN that supports national human resource capacity development by facilitating local content development wherever possible. In so doing, the NREN supports an array of value-added services used to disseminate network management knowledge, research outcomes, and training opportunities to under-resourced institutions across the country.

Research findings suggest that the physical infrastructure and community of practice provided by the NREN is particularly conducive towards national human resource development in the following three ways:

a) Supporting the development of a sector-wide ICT capacity building strategy for the higher education sector, through either top-top government driven, or bottoms-up, member university-based consortium driven models
b) Supplementing under resourced universities through national and international university partnerships for establishing distance learning and exchange program-based training programs for graduate level degrees catering to network engineers and the STEM professions
c) Facilitating local content development through Train the Trainer programs, ICT infrastructure maintenance, and VAS development within national institutions

Background

The Ethiopian NREN, EtherNET, was established in 2001, is driven by a national higher education policy, and is funded entirely by the government. EtherNET uses the infrastructure of the nationally owned Ethio Telecom to connect 36 public institutions with both REN connectivity and commodity Internet. The universities contribute towards the last-mile connectivity from the federal budget allocated by the Ministry of Education. The NREN organizational structure consists of two tiers of membership bodies, with a more select Board of Governors chaired by the Minister of Education as the overall decision-making body. The two membership bodies consist of the presidents of the member public universities meeting on a semi-annual basis, and then an ICT Directorate comprised of the universities' ICT directors and aimed at channeling technical concerns and interest to Board of Governors.[7]

In contrast to Somalia's mostly private entity-driven economic environment, Ethiopia's economy is framed by a systemic state-led Growth and Transformation Plan, under the new collective leadership following former Prime Minister Asres' death.[8] The government is already devoting a very high share of its budget to pro-poor programs and investments, and its centralized, top-down model, has made significant progress over the past two years.[9] The government's restriction on foreign investment in major industries has also kept large parts of the economy closed to global trade and investment.[10] This approach has significantly impacted the EthERNet's approach to foreign firms, local content development, and partnerships with international institutions and ICT industry players.

---

[5] See: http://library.fundforpeace.org/library/cfsir1423-fragilestatesindex2014-06d.pdf
[6] See: http://www.worldbank.org/en/country/ethiopia/overview
[7] See: http://www.ubuntunet.net/ethernet; Interview with Zelalem Asefa, EtheRENet CEO, October 20, 2015.
[8] See: CIA World Factbook, 2015, <https://www.cia.gov/library/publications/the-world-factbook/geos/et.html>.
[9] See: http://www.worldbank.org/en/country/ethiopia/overview.
[10] See: http://www.heritage.org/index/country/ethiopia.

Somalia's NREN, SomaliREN, joined the research and education network community in 2009. The NREN has been founded by nine founding member universities with the help of the Royal Institute of Technology (KTH) and diaspora members from Sweden who saw the REN as a potential solution to some of the challenges facing higher education – namely the lack of sufficient connectivity for education and access to qualified lecturers in the areas of medicine, engineering and science. The telecom industry in Somalia has been hailed as a good example of how the private sector has made great gains in the country even as the public sector still works to establish its systems and processes. The prevalence and success of private entities, both those run by diaspora returnees and those emerging locally is one of the main reasons for the private, non-profit model of SomaliREN governance, though future support from the federal and regional level government administrations would be well received.

To date, lack of financial support from the government and the inability of member institutions to cover the upfront fixed costs of an advanced purchase for bandwidth has kept the SomaliREN from participating fully in the AfricaConnect parallel financing scheme necessary for connecting to UbuntuNet, the regional REN network for Southern and Eastern Africa. Nevertheless, NREN membership has grown despite the lack of an operational communications infrastructure. In the absence of an actual network, SomaliREN has worked to remain active and has been involved with small, stand-alone ICT-based capacity building projects of varying degrees of success through international partnerships with the EU, UNDP, the Turkish government, and the Royal Institute of Technology, Sweden (KTH).[11]

International fibre connectivity bequeathed via the arrival of the EASsy submarine cable in Mogadishu during the first quarter of 2014 has radically improved Somalia's operating environment, including bringing down the price of bandwidth. This development will make it far more feasible to establish REN infrastructure in the future. At the moment, however, with the REN infrastructure still forthcoming, universities have limited Internet connectivity, where most are able to use it only for administrative purposes, with students left to find Internet access outside the institution, typically at cyber cafes. Finally, bandwidth costs remain high in the south central parts of the country where coverage of the ISPs is limited and many organizations still depend on VSAT technology for connectivity.

Ethiopia's context—the NREN as a tool spanning the urban-rural divide and promoting national content development

Currently operating on a USD$70 million budget, funded entirely by the Ethiopian government, EthERNet is operating as a second, alternative, internet service provider, beyond the Ethiopian Telecommunications Corporation (ETC) catering research and higher education institutions, and offering services to 36 universities within the public university system. Since its inception in 2001, the NREN has undergone two evolutionary changes particularly notable for this research.

Centralized Governance Model Still Catering to Member Demand

---

[11] See: Mogadishu University interviews, October 29, 2015.

Over the last decade, the member institutions associated with the NREN have developed an ICT Directorate Forum, which meets quarterly and is comprised of one key individual within each member institution. This individual is typically the head of the IT, computer science, or computer engineering department, an identified as the university's ICT Director and NREN representative. Though the NREN began as a centralized organization that only nominally able to accommodate input from member institutions, the Directorate has become the synthesizing forum from which member university-level needs and demands are now collated and presented to the Ministry of Education. The directorate is now the source from which all NREN decision-making on network infrastructure maintenance, ongoing development, and network related training has emerged,[12] so long as it falls within the general auspices of centralized education policy. While the overall Ethiopian model for NREN development is highly top down and managed through the Ministry of Education, the ICT directorate's consultative model within the overall centralized structure helps allocate the NREN funding to where it is more needed. In addition, while the NREN's close association to the central government helps streamline partnerships with international corporate players such as Microsoft, IBM, Oracle, and CISCO, the ICT directorate's role as conduit has helped the private sector firm's cater training programs to fit institutions' needs and transfer skill training to universities too rural to receive direct training.[13] Finally, particularly as the REN network has reached more and more rural universities over the last few years, training dissemination for staff at more isolated institutions have happened partly with the help of the VC facilities enabled by the REN.[14]

NREN Support for Local Content Development—Interconnectivity and Communities of Practice

A second major evolution within the EthERNet system has been the move towards local content development for all value added services (VAS) offered via the REN. Now that most of the physical infrastructure linking universities to the REN network is complete, institutions are focusing on developing programs for administration applications, human resource management and recruitment applications, student evaluation programs, more sophisticated data collection and housing platform, and an increasingly developing digital library, all of which member universities should be able to access via the REN network. The biggest evolution within this process has been a steady move to develop these applications from scratch rather than commissioning them from foreign firms. The first VAS application, a student progress assessment program, was externally commissioned to an international firm. However, when university administrations needed to go through the foreign firm for all adjustments necessary to accommodate changes in national level regulations, frustration over the universities' lack of ownership over the program grew. A unanimous decision was finally taken to end the contract and transfer control over local content and application development directly to Ethiopian universities.

While not all universities had the capacity to develop such program, four universities, in including Jimma University, developed their own platforms, initially with the support of a technical capacity building partnership between Jimma University and Ghent University of

---

[12] See: Interview with Zelalem Asefa, CEO of EthERNet, 10.20.2015

[13] While there is also a strong argument within the REN community for NRENs to be largely independent of national government, for the purpose of this research, case analysis has looked specifically at Ethiopia's contexts and is based on the sentiments of the individuals interviewed.

[14] See: Interview with Zelalem Asefa, CEO of EthERNet, 10.20.2015.

Belgium and the Belgian organization, VLIR-UOS.[15] Universities who had developed their own platforms then worked with other, less endowed institutions to customize and then share the application. The recipient universities then had the choice to partner with the platform hosting universities to train their own staff on program maintenance or to rely on the host universities for support.[16]

Spanning the Rural-Urban Divide—NREN support for ubiquitous communication links and national institutional development

Of the various stumbling blocks faced by the EthERNet over its tenure, interviewees repeatedly highlighted last mile connectivity to rural universities as one of the greatest challenges. As part of the push to address this gap, EtherNET has asked all member universities to contribute funding to a pooled "pot" allocated towards supporting connectivity to the most under-resourced institutions. While network maintenance, support, and quality of human capacity are also major challenges facing rural universities within the network, expansion of the physical Network infrastructure as served as a significant tool enabling Ethiopia to more equitably distribute training and resources to the higher education sector across rural-urban divide.

Masters degree partnerships between Ethiopian universities and India's National Indian Institute of Technology (NIIT) campuses offset technology and curriculum gaps within Ethiopian institutions via video conference (VC) technology and distance learning programs. In addition, similar resource sharing is beginning between urban and rural institutions in Ethiopia. Over the last several years, new initiatives building on the EthERNet network are starting to mitigate the rural universities' typically far weaker skillset amongst faculty members and underequipped laboratories, in comparison to their rural counterparts. While still in process, plans are in place to use the EthERNet Network Operating Center (NOC) and Data Center to share access to high performance computing resources present at certain universities but absent in others, and pool research findings from various STEM professions across the network.[17] Similarly, an ongoing digital library project currently housing over 6,000 books virtual books housed within the EthERNet's Data Center further supplements the technological and human resource gaps within rural universities.[18] Though the Ethiopian higher education sector has identified a shortage of printed books within the country, the digital library and access to databases and library of international and regional institutions connected via the EthERNet, its connection to UbuntuNet, and now GEANT, has grown the scope of all institutions along the network.

Similarly, Train the Trainer programs supporting network engineers and building capacity of university lecturers are also increasingly able to operate within national institutions without having to rely on knowledge transfer partnerships taking place outside the country.[19] Though capacity building programs are still far from being based entirely in Ethiopia, the higher education sector is interested in keeping skill development as local as possible. The aim is to enable institutional development to grow along with human resource capacity supporting the overall technical capabilities within the country. While not a silver bullet, the NREN's network infrastructure and social network of national and regional REN members has acted as an important enabler for localizing training to the extent it has developed thus far.

---

[15] See: http://www.vliruos.be/en/ongoing-projects/overview-of-ongoing-projects/iuc/institutional-cooperation-with-jimma-university-(ju),-ethiopia/

[16] See: Interview with Girum Ketema, ICT Director, Jimma University; 11.07.2015.

[17] Ibid.

[18] See: Interview with Yonas Mekonnen, System Administrator, EthERNet, 11.08.2015.

[19] Ibid.

Ethiopia's NREN experience demonstrates some of the impact such a network can have on national technical capacity development in fragile and emerging economies, as well as hinting towards the potential gains that still lie ahead.

Somalia's context—the NREN as a source of common ground

Somali universities interviewed for this project have suggested that there is a growing interest within Somali research and education institutions in the role ICTs can play within the sector. However, a general lack of technical capacity and awareness of how ICTs can be used has kept this role under-developed. At some universities, there is no clear concept of what a NOC is and how it can best be used to expand the service offerings of an NREN network. This is the case partly because there is little firsthand experience of NREN networking within the national higher education faculty and administration pool. A common lack of understanding of the role ICTs can play within the university other also keeps university-level investments in communication technologies low. Yet even amid these operating environment constraints, some universities have a dedicated server room, which includes a rack with a server that is designed to host a student information system and a digital library. Other universities, such as SIMAD University in Mogadishu, have appointed a Head of IT who reports to the Director for Institutional Development of the university and helps streamline ICT infrastructure within administrative systems and classroom curricula. Interviews suggest that the awareness of how communication technology can impact quality of education within institutions and the overall national skillset has grown. However, because Internet use is mostly limited to email communications, instant messaging, web browsing and Internet search engine use, even within universities that are considered well resourced, awareness of the extent to which communications infrastructure can augment higher education and research capacity is limited.

Standardizing systems and visions for the future--the NREN as a catalyst for a sector-wide ICT strategy

Amidst these challenges, the findings of this research suggest that, once operational, the Somalia NREN's physical network infrastructure and connections to other member institutions can act as a conduit for human resources capacity building, particularly within the Somali context. Somali higher education institutions that are members of the NREN have in the past benefited from capacity building efforts funded by the EU and other donors, and facilitated by Kenyan universities as twinning partners. The NREN has also been a source of common ground between member institutions that has made it possible for to share the knowledge created from international partnerships with certain universities across other institutions. In addition, the NREN has created a number of cross-border partnerships and opportunities that have served both sides well. For example, local universities have engaged the services of their foreign partner universities in developing curriculums and conducting curriculum reviews.

The NREN as a Facilitator and Organizer of Capacity Building Initiatives

Despite the fact that there is still no connectivity infrastructure in place, the SomaliREN's outward facing role has already served as an intermediary body linking Somali universities and international institutions through learning and training initiatives. Though it has not been able to capitalize on the fibre-optic network of a typical NREN, it has already facilitated

trainings its connection to the UbuntuNet Alliance helped initiate.[20] Though these are still stand-alone initiatives without the scope of a national project, some universities have received knowledge and skills in the areas of management, curriculum development and ICTs thanks to these connections. In this sense, the NREN has played a small-scale role as a coordinator of the capacity building initiatives. This hints of what could come should the physical REN infrastructure would be deployed. Similarly, its impact could have been multiplied, had the higher education sector developed a unified strategy for the NREN to contribute to building the country's human resources capacity.

As a conduit, the NREN could also connect the Somali higher education institutions and the private sector to facilitate the transfer of knowledge as well as assist in the creation of new skills or innovative ways to apply existing skills. Currently, many of the universities in Somalia are employing expat professors and lecturers to supplement the shortage of qualified skilled educators in the areas of engineering and the sciences. Other institutions are partnering with foreign (mostly Open Universities) to offer distance learning postgraduate programs. These programs usually require local facilitators to guide the students and help grade their work before submission to the foreign partner. In many instances, shortages of lecturers in certain disciplines, or security constraints limiting instructors' physical presence, result in the university assigning potentially under qualified lecturers with little consideration for the instructor's actual capability. The NREN could play a significant role in filling these gaps by providing live-streaming video-conferencing lectures by the actual course instructor and there would be no need for a local facilitator.

Although these forms of knowledge transfer and capacity development focus on academic institutional development, they facilitate a sharing and exchange of ideas and best practices which can impact the ICT sector and the medical and science professions in which Somali post-graduates would ideally eventually be employed. Interviews with the ICT directors at two universities showed that the biggest driver of ICT capacity building in their institutions were the partnership agreements and collaborations they made with their foreign counterparts. The provision of video-conferencing facilities in the universities is seen as a cost-effective means to access qualified instructors and improve inter-university collaborations, making the most of the MoUs signed in partnership with many foreign universities.

The NREN Building Out Institutional Capacity

Interviewees have reiterated the sentiment that the universities in Somalia are well-positioned to multiply the reach and scope of capacity building initiatives where the NREN could play the role of the coordinator and organizer of capacity building activities.[21] For this to succeed there should be a common understanding of the existing knowledge gaps that inhibit national growth and development. It is also pertinent to have a standardized assessment of technical and human capacities to identify the gaps that need to be addressed by the capacity building efforts.

The approach that has been echoed by the ICT directors and institutional development directors of the universities interviewed for this research is to create a network of trainers across the member institutions of the NREN that will be accountable to the NREN in carrying

---

[20] See: Interview with Mogadishu University stakeholders, 10.29.2015.
[21] See: Interview with Kismayo and Golis University stakeholders, 11.06.2015.

out the mandate of training other trainers to extend the reach of any human capacity building program to have the required multiplicative effect of the skills to be created or developed.[22]

Sentiments from the ground seem to be pushing for capacity building initiatives based on an officially recognized, crosscutting, and ideally national-level strategy, based on standardized assessments. The NREN could potentially play a role bringing together policy makers and education institutions to develop such a unified human resource development strategy in the case where government leadership is not making such a push. Potentially using its independent, non-profit status as an advantage, as it continues to develop, SomaliREN could follow the lead of the private sector actors in the Somali economy and provide support to both the ICT sector and the higher education sector in areas where the government is still weak.

Conclusion

In addition to a REN's primary mandate to provide connectivity for the higher education sector, this paper explores some of the underlying contributions that a national Research and Education Network can provide to a country's economic development -specifically human resource capacity in the technology and technical fields. Taking a comparative view of Somalia and Ethiopia's NREN experience thus far, this research inquiry identifies the NREN's ability to facilitate a sector wide ICT capacity building strategy for higher education and research institutes, national and international university partnerships for distance learning and exchange program-based training programs, and train the trainer programs on ICT infrastructure maintenance and VAS development within national institutions as key areas where it can support national level human resource capacity growth.

Newly developing NRENs, particularly those at Level 3 of the NREN Maturity Model as proposed by Duncan Greaves,[23] former CEO of TENET, South Africa's NREN, often face challenges with having their member institutions understand how research and education networking can be best be used to maximize its potential. The NREN experience in Somalia suggests that a vaguely defined NREN sometimes generates varied, and at times, unrealistic expectations from the members as to what value NREN membership may provide their respective institution.

Again, the Somalia context, an example of NREN development in its early stages, and the Ethiopia context as a more mature NREN where great effort has gone into bringing infrastructure to isolated, rural areas, both demonstrate how this lack of clarity can develop in part through the NREN's marketing at project inception. In both cases, the rationale of establishing the NREN focuses on the value for money argument where the Network would provide more affordable bandwidth than otherwise available by through demand aggregation and leveraging member institutions' collective purchasing power. Given the challenge of laying and maintaining first-mover fibre-optic communication infrastructure, priority is often given to basic infrastructure development and last-mile reach, while knowledge transfer and training programs and value added services building on the bandwidth provision get less attention. Even once the infrastructure is in place, lack of awareness raising and technical skill development at the university level and within the NREN administrative organization can result in the research and education network being underutilized. Yet while it needs its own set of capacity programs to function effectively, the NREN can play as a coordinator and

---

[22] See: Interview with Kismayo University stakeholder, 11.08.2015.
[23] See: Greaves, Duncan. "An NREN Capability Maturity Model." Tertiary Education Network, UbuntuNet Alliance, 2013. Web. < http://www.ubuntunet.net/sites/default/files/NREN_Capability_Maturity.pdf>

facilitator for this and other national-level skill training and knowledge transfer initiatives. Ethiopia's EtherNET and Somalia's SomaliREN have been able to facilitate these activities to varying degrees in their respective contexts to varying degrees, with their methods of operation and organizational structure being in part a function of the environments in which they operate.

Moving forward, Somalia's experience demonstrates that an NREN can build communities of practice along with, and even prior to its work implementing the physical infrastructure. Ethiopia's experience involving university-based ICT directors in key decision-making demonstrates how both government-led and private entity-driven NREN governance models can effectively incorporate member interests and concerns. As the NRENs in both countries continue to expand in different ways, it might be prudent to consider how some of the value added services that make an NREN so unique can be utilized by universities to better support the development of a domestic skilled talent pool.

One option, of many, is to offer NREN capabilities as a consultative service, which could generate additional revenue streams to be reinvested back to support the project's sustainability. In the interspace linking the higher education and ICT sectors, the NREN's organizational structure and network-based value-added services can act as source of common ground and mutual gain-driven collaboration member institutions. Particularly in the context of recently fragile or post-conflict states, the cases looked at for this inquiry shed light on how an NREN can be used to grow research and education and technology-based ecosystems growing the ability of local populations to populate and sustain their countries' economy long-term.

Biography

Rachel Firestone is working with the World Bank Group on ICT policies and applications, particularly in the contexts of fragility and conflict. Rachel works on ICT projects that use innovation and broadband infrastructure as tools to accelerate economic development process and improve partnership and transparency between governments, academia, the private sector, and grassroots communities. Prior to coming to the World Bank, Rachel completed her Masters at Georgetown University's Masters of Science in Foreign Service program, in the Global Politics and Security, focusing on community resilience and post-conflict reconstruction. Prior to working in East Africa, Rachel also spent five years in India working on using ICTs and multi-stakeholder partnerships to support social inclusion and self-advocacy initiatives with communities recovering from sectarian violence and internal displacement. When she is not working with tech hubs and academic institutions on cross-sector learning and collaboration, Rachel enjoys climbing, running, and cooking very spicy meals.