

JORDAN CHAMBERLIN

Senior Scientist – Agricultural Economist
Global team leader: Analytics for Rural Transformation
Sustainable Agrifood Systems Program
International Maize and Wheat Improvement Center (CIMMYT)
Nairobi, Kenya

Email: j.chamberlin@cgiar.org
jordan.chamberlin@gmail.com
Phone: +254 794985675 / 783289557

ORCID: [0000-0001-9522-3001](https://orcid.org/0000-0001-9522-3001)
Scopus Author ID: [7005396229](https://scopus.org/authorID/7005396229)
[Google Scholar](#); [RePEc](#)

RESEARCH INTERESTS

I conduct applied research on rural development and economic growth, with an emphasis on smallholder agriculture and rural household welfare in developing countries. I am particularly interested in how rural households participate in the transformational changes currently taking place in the developing world in terms of who wins and who loses, and how we account for such tradeoffs over different timeframes and scopes of analysis. My work emphasizes microeconomic foundations for conceptualizing such processes and their impacts on decision-making processes of interest. Areas of recent research include: smallholder access to land under evolving land institutions in sub-Saharan Africa; the efficiency of market intermediation services; the provision of infrastructure and other public goods; and the characteristics of rural input supply markets. In addition to traditional microeconomic and econometric research methods, my work often incorporates theoretical and empirical approaches which are explicitly spatial in nature, including spatial econometric methods and geographic information science. Much of my work has involved the design and collection of household survey data, which I have sometimes implemented alongside randomized control trials to measure intervention impacts.

PROFESSIONAL EXPERIENCE

Senior Scientist, International Maize and Wheat Improvement Center, Nairobi, Kenya (2015-present)

Economist, Food and Agriculture Organization of the United Nations, Rome, Italy (2021-2022)

Assistant Professor, Michigan State University, East Lansing, Michigan (2013-2015)

Scientist, International Food Policy Research Institute, Addis Ababa, Ethiopia (2004-2008)

EDUCATION

PhD, Agricultural Economics, 2013: Michigan State University, East Lansing, MI, USA.
Specialization: Rural Infrastructure Investments and Market Access for Smallholder Farmers.

SELECTED PUBLICATIONS (SINCE 2013)

Snapp, S., J. **Chamberlin**, L. Winowiecki, T. Amede, E. Betemariam, S. Gameda, J. E. Herrick, R. Lal, P. Marennya, L. Nagarajan, Z. Stewart & T. Vågen. 2024. Realizing soil health for food security in Africa. *Nature Sustainability* (in press; <https://doi.org/10.1038/s41893-024-01482-9>)

Mondschein, Z., Paliwal, A., Sida, T.S., **Chamberlin**, J., Wang, R. and Jain, M., 2024. Mapping Field-Level Maize Yields in Ethiopian Smallholder Systems Using Sentinel-2 Imagery. *Remote Sensing*, 16(18), p.3451. <https://doi.org/10.3390/rs16183451>

Sumberg, J., Holland-Szyp, C., Yeboah, T., Oosterom, M., Crossouard, B. and **Chamberlin**, J., 2024. Young people, livelihood building and the transformation of African agriculture: A reality check. *Global Food Security*, 41, p.100759. <https://doi.org/10.1016/j.gfs.2024.100759>

Harris, D., Mausch, K., & **Chamberlin**, J. 2024. Land and technology requirements for economically prosperous smallholder farming in sub-Saharan Africa: Evidence from Tanzania. *Outlook on Agriculture*, 0(0). <https://doi.org/10.1177/00307270241248667>

Jaleta, M., Vasco Silva, J., Ruganzu, V., Mvuyekure, S.M., Mujanama, E., Voss, R., Chamberlin, J. and Baudron, F., 2024. Is agricultural lime a profitable investment for African smallholders? Evidence from Rwanda. *African Journal of Agricultural and Resource Economics*, 19(1), pp.1-18. [https://doi.org/10.53936/afjare.2024.19\(1\).1](https://doi.org/10.53936/afjare.2024.19(1).1)

Paudel, G.P., J. **Chamberlin**, B. Singh, S. Maharjan, T.T. Nguyen, P. Craufurd, and A.J. McDonald. 2023. "Insights for climate change adaptation from early sowing of wheat in the Northern Indo-Gangetic Basin." *International Journal of Disaster Risk Reduction* May 2023, 103714. <https://doi.org/10.1016/j.ijdrr.2023.103714>

Abate, G.T., Abay, K.A., **Chamberlin**, J., Kassim, Y., Spielman, D.J. and Tabe-Ojong, M.P.J., 2023. "Digital tools and agricultural market transformation in Africa: Why are they not at scale yet, and what will it take to get there?" *Food Policy* 116, 102439. <https://doi.org/10.1016/j.foodpol.2023.102439>

Snapp, S., Sapkota, T.B., **Chamberlin**, J., Cox, C.M., Gameda, S., Jat, M.L., Marennya, P., Mottaleb, K.A., Negra, C., Senthilkumar, K. and Sida, T.S., 2023. Spatially differentiated nitrogen supply is key in a global food–fertilizer price crisis. *Nature Sustainability*, 6(10), pp.1268-1278. <https://doi.org/10.1038/s41893-023-01166-w>

Sida, T.S., Gameda, S., **Chamberlin**, J., Andersson, J.A., Getnet, M., Woltering, L. and Craufurd, P., 2023. Failure to scale in digital agronomy: An analysis of site-specific nutrient management decision-support tools in developing countries. *Computers and Electronics in Agriculture*, 212, p.108060. <https://doi.org/10.1016/j.compag.2023.108060>

Amare, M., Abay, K.A. and **Chamberlin**, J., 2023. "The role of spatial inequalities on youth migration decisions: Empirical evidence from Nigeria." *Journal of Development Studies* 0:0, 1-22. <https://doi.org/10.1080/00220388.2023.2182681>

Jayne, T.S., A. Wineman, J. **Chamberlin**, M. Muyanga, & F. K. Yeboah. 2022. "Changing Farm Size Distributions and Agricultural Transformation in Sub-Saharan Africa." *Annual Review of*

Resource Economics 2022 14:1, 109-130. <https://doi.org/10.1146/annurev-resource-111220-025657>

Ayalew, H., J. **Chamberlin**, & C. Newman. 2022. "Site-Specific Agronomic Information and Technology Adoption: A Field Experiment from Ethiopia." *Journal of Development Economics* (2022) 102788. <https://doi.org/10.1016/j.jdeveco.2021.102788>

Oyinbo, O., J. **Chamberlin**, M. Maertens & T. Abdoulaye. 2022. "Digital Extension, Price Risk and Farm Performance: Evidence from Nigeria." *American Journal of Agricultural Economics*. <http://doi.org/10.1111/ajae.12242>

Abay, K., T. Wossen, & J. **Chamberlin**. 2022. "Mismeasurement and efficiency estimates: Evidence from smallholder survey data in Africa." *Journal of Agricultural Economics*. <http://doi.org/10.1111/1477-9552.12514>

Tiedeman, K., **Chamberlin**, J., Kosmowski, F., Ayalew, H., Sida, T. and Hijmans, R.J., 2022. "Field Data Collection Methods Strongly Affect Satellite-Based Crop Yield Estimation." *Remote Sensing*, 14(9), p.1995. <https://doi.org/10.3390/rs14091995>

Ricker-Gilbert, J., Jayne, T.S. and **Chamberlin**, J., 2022. "Absentee tenants and farmland transfers in sub-Saharan Africa: evidence from Malawi." *Development in Practice*, 32(3), pp.375-393. <https://doi.org/10.1080/09614524.2021.1937567>

Ricker-Gilbert, J., J. **Chamberlin**, & J. Kanyamuka. 2022. "Soil Investments on Rented versus Owned Plots: Evidence from a Matched Tenant-Landlord Sample in Malawi." *Land Economics* 98 (1), 165-186. <https://doi.org/10.3368/le.98.1.062619-0084R1>

Abay, K.A., Abay, M.H., Berhane, G. and **Chamberlin**, J., 2022. "Social protection and resilience: The case of the productive safety net program in Ethiopia." *Food Policy* 112, 102367. <https://doi.org/10.1016/j.foodpol.2022.102367>

Abay, K., G. Berhane, B. Koru, J. **Chamberlin**. 2022. "Does Rainfall Variability Explain Low Uptake of Agricultural Credit? Evidence from Ethiopia." *European Review of Agricultural Economics*, jbab013, <https://doi.org/10.1093/erae/jbab013>

Bonilla Cedrez, C., J. **Chamberlin**, & R. Hijmans. 2021. "Price constraints to increasing crop production in Sub-Saharan Africa." *Nature Food* 2, 766–772 (2021). <https://www.nature.com/articles/s43016-021-00370-1>

Jayne, T.S., **Chamberlin**, J., Holden, S., Ghebru, H., Ricker-Gilbert, J. & F. Place. 2021. "Rising land commodification in sub-Saharan Africa: Reconciling the diverse narratives." *Global Food Security*, 30, p.100565. <https://doi.org/10.1016/j.gfs.2021.100565>

Chamberlin, J., T. S. Jayne, & S. Snapp. 2021. "The Role of Active Soil Carbon in Influencing the Profitability of Fertilizer Use: Empirical Evidence from Smallholder Maize Plots in Tanzania." *Land Degradation and Development* 32(9), pp.2681-2694. <https://doi.org/10.1002/ldr.3940>

Chamberlin, J., Ramos, C. & Abay, K. 2021. "Do more Vibrant Rural Areas have Lower Rates of Youth Out-Migration? Evidence from Zambia." *European Journal of Development Research* 33, 951–979 (2021). <https://doi.org/10.1057/s41287-021-00404-1>

Kosmowski, F., **Chamberlin, J.**, Ayalew, H., Sida, T., Abay, K. & Craufurd, P., 2021. "How accurate are yield estimates from crop cuts? Evidence from smallholder maize farms in Ethiopia." *Food Policy*, 102, p.102122. <https://doi.org/10.1016/j.foodpol.2021.102122>

Erenstein, O., J. **Chamberlin**, & K. Sonder. 2021. "Estimating the global number and distribution of maize and wheat farms." *Global Food Security*, 30: 100558. <https://doi.org/10.1016/j.gfs.2021.100558>

Rutsaert, P., J. **Chamberlin**, K. Oluoch, V. Ochieng Kitoto, & J. Donovan. 2021. "The geography of agricultural input markets in rural Tanzania." *Food Security* (2021):1-13. <https://doi.org/10.1007/s12571-021-01181-9>

Erenstein, O., J. **Chamberlin**, & K. Sonder. 2021. "Farms worldwide: 2020 and 2030 outlook." *Outlook on Agriculture* 50(3): 221-229. <https://doi.org/10.1177/00307270211025539>

Ricker-Gilbert, J., J. **Chamberlin**, & J. Kanyamuka. 2021. "Soil Investments on Rented Versus Owned Plots: Evidence from a Matched Tenant-Landlord Sample in Malawi." *Land Economics*. <https://doi.org/10.3368/le.98.1.062619-0084R1>

Ricker-Gilbert, Jacob, T.S. Jayne, and Jordan **Chamberlin**. 2021. "The Growth of Absentee Tenants and The Future of Farmland in sub-Saharan Africa: Evidence from Malawi." *Development in Practice*. <https://doi.org/10.1080/09614524.2021.1937567>

Amare, Mulubrhan, Kibrom Abay, Luca Tiberti, and Jordan **Chamberlin**. 2021. "Impacts of COVID-19 on Food Security: Panel Data Evidence from Nigeria." *Food Policy* 101(May 2021):102099 <https://doi.org/10.1016/j.foodpol.2021.102099>

Ayalew, Hailemariam, Yeshwas Admasu and Jordan **Chamberlin**. 2021. "Is Land Certification Pro-poor? Evidence from Ethiopia." *Land Use Policy* 107 (2021) 105483. <https://doi.org/10.1016/j.landusepol.2021.105483>

Sida, Tesfaye, Jordan **Chamberlin**, Hailemariam Ayalew, Frederic Kosmowski, and Peter Craufurd. 2021. "Implications of intra-plot heterogeneity for yield estimation accuracy and land productivity in smallholder maize systems." *Field Crops Research*. Volume 267, 15 June 2021, 108147. <https://doi.org/10.1016/j.fcr.2021.108147>

Ravensbergen, Arie, Jordan **Chamberlin**, Peter Craufurd, Bello Muhammad Shehu, Renske Hijbeek. "Predicting maize yield response to nutrient supply under highly variable management: a quantile regression approach using QUEFTS in Nigeria." *Field Crops Research*. Volume 266, 1 June 2021, 108126. <https://doi.org/10.1016/j.fcr.2021.108126>

Abay, K., J. **Chamberlin**, G. Berhane. 2020. "Are Land Rental Markets Responding to Rising Population Pressures and Land Scarcity in sub-Saharan Africa?" *Land Use Policy*. <https://doi.org/10.1016/j.landusepol.2020.105139>

Bonilla Cedrez, C., J. **Chamberlin**, and R.J. Hijmans. 2020. "Seasonal, Annual and Spatial Variation in Cereal Prices in Sub-Saharan Africa." *Global Food Security* 26(September 2020): 100438. <https://doi.org/10.1016/j.gfs.2020.100438>

Palmas, S., and J. **Chamberlin**. 2020. "A Spatial Ex Ante Analysis of Fertilizer Profitability in Tanzania." *PLoS ONE* 15(9): e0239149. <https://doi.org/10.1371/journal.pone.0239149>

Abay, K., H. Ayalew, W. Asnake, J. **Chamberlin** and J. Sumberg. 2020. "Landscapes of opportunity: Patterns of young people's engagement with the rural economy in sub-Saharan Africa" *The Journal of Development Studies* <https://doi.org/10.1080/00220388.2020.1808195>

Chamberlin, J., T. S. Jayne, and N. J. Sitko. 2020. "Rural In-Migration and Agricultural Development: Evidence from Zambia." *Agricultural Economics* 51(4):491-504
<https://doi.org/10.1111/agec.12567>

Chamberlin, J. and T.S. Jayne. 2020. "Does farm structure affect rural household incomes? Evidence from Tanzania." *Food Policy* 90(2020):101805.
<https://doi.org/10.1016/j.foodpol.2019.101805>

Bonilla Cedrez, C., J. **Chamberlin**, Z. Guo. and R. J. Hijmans. 2020. "Spatial variation in fertilizer prices in Sub-Saharan Africa." *PLoS ONE* 15(1): e0227764.
<https://doi.org/10.1371/journal.pone.0227764>

Assefa, B.T., J. **Chamberlin**, P. Reidsma, J. Vasco Silva, and M.K. van Ittersum. 2019. "Unravelling the variability and causes of smallholder maize yield gaps in Ethiopia." *Food Security* 12(1):83-103. <https://doi.org/10.1007/s12571-019-00981-4>.

Ricker-Gilbert, J., J. **Chamberlin**, J. Kanyamuka, C.B.L. Jumbe, R. Lunduka, and S. Kaiyatsa. 2019. "How do Informal Farmland Rental Markets Affect Smallholders' Well-being? Evidence from a Matched Tenant-Landlord Survey in Malawi." *Agricultural Economics* (2019) DOI: <https://doi.org/10.1111/agec.12512>

Oyinbo, O., **Chamberlin**, J., Vanlauwe, B., Vranken, L., Kamara, A., Craufurd, P. & M. Maertens. 2019. "Farmers' preferences for high-input agriculture supported by site-specific extension services: evidence from a choice experiment in Nigeria." *Agricultural Systems*, 173, 12-26. DOI: <https://dx.doi.org/10.1016/j.agsy.2019.02.003>

Alwang, J., E. Gotor, G. Thiele, G. Hareau, M. Jaleta, and J. **Chamberlin**. 2019. "Pathways from research on improved staple crop germplasm to poverty reduction for smallholder farmers." *Agricultural Systems* 172:16-27 (June 2019). <http://dx.doi.org/10.1016/j.agsy.2017.10.005>

Jayne, T. S., J. **Chamberlin** and R. Benfica. 2018. "Africa's Unfolding Economic Transformation: Introduction to the Special Issue on Economic Transformation in Sub-Saharan Africa." *Journal of Development Studies* 54(5). <https://doi.org/10.1080/00220388.2018.1430774>

Ricker-Gilbert, J., and J. **Chamberlin**. 2018. "Transaction Costs, Land Rental Markets and Their Impact on Youth Access to Agriculture in Tanzania." *Land Economics* 94:4 (November 2018). <http://doi.org/10.3368/le.94.4.541>

Ripoll, Santiago, Jens Andersson, Lone Badstue, Marion Büttner, Jordan **Chamberlin**, Olaf Erenstein and James Sumberg. 2017. "Rural transformation, cereals and youth in Africa: What role for international agricultural research?" *Outlook on Agronomy* 46(3): 2017.
<https://doi.org/10.1177/0030727017724669>

Sitko, Nicholas, Jordan **Chamberlin**, Benedito Cunguara, Milu Muyanga and Julius Mangisoni. 2017. "A comparative political economic analysis of maize sector policies in eastern and southern Africa." *Food Policy* 69:243–255. <https://doi.org/10.1016/j.foodpol.2017.04.010>

Chamberlin, Jordan and Jacob Ricker-Gilbert. 2016. "What are the Drivers of Rural Land Rental Markets in sub-Saharan Africa, and how do they Impact Household Welfare? Evidence from Malawi and Zambia." *American Journal of Agricultural Economics* 98(5): 1507-1528.
<https://doi.org/10.1093/ajae/aaw021>

Jayne, T.S., Jordan **Chamberlin**, Lulama Traub, Nicholas Sitko, Milu Muyanga, Felix K. Yeboah, Ward Anseeuw, Antony Chapoto, Ayala Wineman, Chewe Nkonde and Richard Kachule. 2016. "Africa's Changing Farm Size Distribution Patterns: The Rise of Medium-Scale Farms." *Agricultural Economics* 47s:197-214. <https://doi.org/10.1111/agec.12308>

Sitko, Nicholas, and Jordan **Chamberlin**. 2016. "The geography of Zambia's customary land: Assessing the prospects for smallholder development." *Land Use Policy* 55:49–60.
<https://doi.org/10.1016/j.landusepol.2016.03.026>

Hichaambwa, Munguzwe, Jordan **Chamberlin**, and Nicholas Sitko. 2015. "Determinants and welfare effects of smallholder participation in horticultural markets in Zambia." *African Journal of Agricultural and Resource Economics* 10(4):279-296.

Sitko, Nicholas, and Jordan **Chamberlin**. 2015. "The Anatomy of Medium-Scale Farm Growth in Zambia: What Are the Implications for the Future of Smallholder Agriculture?" *Land* 2015(4):869-887. <https://doi.org/10.3390/land4030869>

Sitko, Nicholas, Jordan **Chamberlin** and Munguzwe Hichaambwa. 2014. "Does Smallholder Land Titling Facilitate Agricultural Growth? An Analysis of the Determinants and Effects of Smallholder Land Titling in Zambia." *World Development* 64:791–802.
<https://doi.org/10.1016/j.worlddev.2014.07.014>

Chamberlin, Jordan, T. S. Jayne, and Derek Headey. 2014. "Scarcity Amidst Abundance? Reassessing the Potential for Cropland Expansion in Africa." *Food Policy* 48:51-65.
<https://doi.org/10.1016/j.foodpol.2014.05.002>

Jayne, T.S., Jordan **Chamberlin** and Derek Headey. 2014. "Land Pressures, the Evolution of Farming Systems, and Development Strategies in Africa: A Synthesis." *Food Policy* 48:1-17.
<https://doi.org/10.1016/j.foodpol.2014.05.014>

Ricker-Gilbert, Jacob, Charles Jumbe, and Jordan **Chamberlin**. 2014. "The Impact of Increasing Population Density on African Agriculture and Livelihoods: The Case of Malawi." *Food Policy* 48:114-128. <https://doi.org/10.1016/j.foodpol.2014.02.006>

Jayne, T.S., Antony Chapoto, Nicholas Sitko, Chewe Nkonde, Milu Muyanga, and Jordan **Chamberlin**. 2014. "Is the Scramble for Land in Africa Foreclosing a Smallholder Agricultural Expansion Strategy?" *Journal of International Affairs* Spring 2014.
<https://www.jstor.org/stable/24461734>

Chamberlin, Jordan and T.S. Jayne. 2013. "Unpacking the Meaning of 'Market Access'." *World Development* 41:245–264. <https://doi.org/10.1016/j.worlddev.2012.06.004>

JOURNAL SPECIAL ISSUES

Abay, Kibrom, Jordan **Chamberlin**, David Spielman, and Pauline Chivenge (Editors of special issue). 2024. "Fertilizer and soil health policies in the context of global supply disruptions and economic crises." *Food Policy (in preparation)*.

Jayne, T.S., Jordan **Chamberlin** and Rui Benfica (Editors of special issue). 2018. "The Role of Agricultural Transformation within Africa's Economic Development Process." *Journal of Development Studies*: 5/4 (2018).

Jayne, T.S., Derek Headey and Jordan **Chamberlin** (Editors of special issue). 2014. "Boserup and Beyond: Mounting Land Pressures and Development Strategies in Africa". *Food Policy*, Volume 48, Pages 1-202 (October 2014).

BOOKS

Jayne, T. S., Jordan **Chamberlin**, and Rui Benfica (editors). 2019. *The Transformation of Rural Africa*. Routledge: New York. ISBN13: 978-1-138-32549-4

BOOK CHAPTERS

Oosterom, M., J. **Chamberlin** and J. Sumberg. 2021. "Empirical windows on African rural youth." Chapter 2 in Sumberg, J. (editor), *Youth and the Rural Economy in Africa: Hard Work and Hazard*, CABI Publishing, pp. 23-42.

Chamberlin, J., F. K. Yeboah and J. Sumberg. 2021. "Young people and land." Chapter 4 in Sumberg, J. (editor), *Youth and the Rural Economy in Africa: Hard Work and Hazard*, CABI Publishing, pp 58-77.

Chamberlin, J. and J. Sumberg. 2021. "Are young people transforming the rural economy?" Chapter 6 in Sumberg, J. (editor), *Youth and the Rural Economy in Africa: Hard Work and Hazard*, CABI Publishing, pp. 92-124.

Sumberg, J., C. Szyp, T. Yeboah, M. Oosterom, B. Crossouard and J. **Chamberlin**. 2021. "Young people and the rural economy: synthesis and implications." Chapter 10 in Sumberg, J. (editor), *Youth and the Rural Economy in Africa: Hard Work and Hazard*, CABI Publishing, pp. 173-180.

Jayne, T.S., Benfica, R., Yeboah, F.K. and J. **Chamberlin**. 2019. "Agricultural Transformation and Africa's Economic Development", Nnadozie, E. and Jerome, A. (Ed.) African Economic Development, Emerald Publishing Limited, Bingley, pp. 349-375. <https://doi.org/10.1108/978-1-78743-783-820192018>

Chamberlin, J. and E. Schmidt. 2013. “Ethiopian Agriculture: A Dynamic Geographic Perspective.” Chapter 2 in Dorosh, P. and Rashid, S. (editors), *Food and Agriculture in Ethiopia: Progress and Policy Challenges*. International Food Policy Research Institute and University of Pennsylvania press.

RECENT UNIVERSITY SERVICE AND TEACHING

Recent external PhD advisor/committee member service: KU Leuven (Bioeconomics), Leibniz University Hannover (Economics), Wageningen University (Plant Production Systems), Purdue University (Agricultural Economics), University of Minnesota (Applied Economics), Lund University (Geography).

GRANTS

Bill and Melinda Gates Foundation (2024-2025). “Reinvestment: Guiding Acid Soils Management Investments in Africa.” BMGF investment number INV-068374 (PI: Chamberlin; lead proposal) 1,500,000 USD.

Bill and Melinda Gates Foundation (2020-2024). “Guiding Acid Soils Management Investments in Africa (GAIA)” BMGF investment number INV-002829 (PI: Chamberlin; co-lead proposal development) 5,000,000 USD.

International Food Policy Research Institute (2018-2020). Policies, Institutions and Markets CRP Flagship 2 project “Ongoing transformations in Africa’s rural factor markets: Implications for growth, productivity and welfare.” (PI: Chamberlin) 240,000 USD.

Bill and Melinda Gates Foundation (2019-2020). “Taking Maize Agronomy to Scale in Africa” (PI: Chamberlin) 1,300,000 USD.

USAID (2019-2020). Innovation Lab for Sustainable Intensification: Geospatial and Farming Systems Consortium. “Spatial profitability of alternative production strategies in maize-based smallholder farming systems in sub-Saharan Africa.” (PI: Chamberlin) 200,000 USD.

CGIAR Gender Platform (2019). “Rural Out-Migration and the Feminization of Agriculture in sub-Saharan Africa: A Multi-Country, Mixed-Methods Study” (PI: Chamberlin) 50,000 USD.

WORKING LANGUAGES

English (native), Spanish (fluent), Portuguese (operational), Amharic (basic), Italian (basic)