

Dr. Andy Jarvis

Program Leader Decision and Policy Analysis, International Center for Tropical Agriculture (CIAT), Recta Cali-Palmira km17, Cali, Colombia. Tel. +57 2 4450000. Email: a.jarvis@cgiar.org

Dr. Andy Jarvis is the Director of the Decision and Policy Analysis Area in the International Centre for Tropical Agriculture (CIAT) and is a Flagship Leader on the CGIAR Research Program for Climate Change, Agriculture and Food Security (CCAFS), based in Cali, Colombia. Dr. Jarvis has 10 years experience of cutting edge scientific research in developing countries to support the goals of alleviating poverty and protecting essential ecosystem services of importance to humanity. His research has focused on the use of spatial analysis and environmental modeling to address issues such as agricultural biodiversity conservation, adaptation to climate change, and maintenance of ecosystem services. Over the past ten years Dr. Jarvis has published over 70 articles, book chapters or books, with over 30 of these in peer-reviewed articles published in international journals. Dr. Jarvis has also worked as a consultant to the Food and Agriculture Organisation (FAO) on developing climate change strategies to conserve agricultural biodiversity, and been a consultant on a variety of projects for the European Union, Global Environment Facility amongst others. In 2003 Dr. Jarvis won the Crop Science Society of America (CSSA) C-8 Genetic Resources award for best research paper stemming from his work on conservation prioritization research for wild peanuts in Latin America, and in 2009 received the prestigious Ebbe Nielsen award for innovative research in bioinformatics and biosystematics.

EDUCATION

2001 – 2005: *PhD*, Department of Geography, King's College London. Thesis entitled: "Terrain controls on the distribution of tree species diversity and structure in tropical lowland and tropical montane forest".

1996 – 1999: Undergraduate degree program at the Department of Geography, King's College London (part of University of London), receiving a *First Class BSc. Degree with Honours*.

APPOINTMENTS

Current – Decision and Policy Analysis Research Area Director, International Centre for Tropical Agriculture (CIAT) and Theme Leader for Adaptation to Progressive change for the CGIAR Research Program CCAFS. Principal scientist position with duties which include administering and leading the Decision and Policy Analysis Research Area (DAPA) of CIAT, leading a research agenda on adaptation to progressive climate change across the CGIAR, supervising staff and students (undergrad, masters and PhD level), proposal development and fund raising.

Postdoctoral Research Fellow: 2004 – 2006 Joint-position between CIAT and Bioversity International, housed in the Land Use Project of CIAT.

RELEVANT PUBLICATIONS

Reymondin L, Coca A, Arango D, Jarvis A, Navarrete C, Suding P, Watkins G. 2014. Potential Impact of Road Projects on Habitat Loss and Greenhouse Gas Emissions in Guyana from 2012 to 2022. Published technical note by Inter-American Development Bank (IDB). p 45.

Ramirez-Villegas J, Cuesta F, Devenish C, Peralvo M, Jarvis A, Arnillas C. 2014. Using species distributions models for designing conservation strategies of Tropical Andean biodiversity under climate change. *Journal for Nature Conservation*. doi.org/10.1016/j.jnc.2014.03.007.

- Legg J, Somado E, Barker I, Beach L, Ceballos H, Cuellar W, Elkhoury W, Gerling D, Helsen J, Hershey C, Jarvis A, et al. 2014. A global alliance declaring war on cassava viruses in Africa. *Food Security: The Science, Sociology and Economics of Food Productions and Access to Food* 6 (2): 1 -20
- Khoury C, Bjorkman a, Dempewolf H, Ramirez-Villegas J, Guarino L, Jarvis A, Rieseberg L, Struikb P. 2014. Increasing homogeneity in global food supplies and the implications for food security. *PNAS*. 111 (11) p 4001–4006. DOI: 10.1073/pnas.1313490111.
- Warren R, VanDerWal J, Price J, Welbergen J, Atkinson I, Ramírez-Villegas J, Osborn T J, Jarvis A, Shoo L P, Williams S E, LOWE J. 2013. Quantifying the benefit of early climate change mitigation in avoiding biodiversity loss. *Nature Climate Change* 3: 678-682.
- Vermeulen S J, Challinor A, Thornton P K, Campbell B M, Eriyagama N, Vervoort, J M, Kinyangi J, Jarvis A, Läderach P, Ramírez-Villegas J, Nicklin K J, Hawkins E, Smith D R. 2013. Addressing uncertainty in adaptation planning for agriculture. *Proceedings of the national academy of sciences of the United States of America* 110 (21): 8357-8362.
- Reymondin L, Argote K, Jarvis A, Navarrete C, Coca A, Grossman D, Villalba A, Suding P. 2013. Road impact assessment using remote sensing methodology for monitoring land-use change in Latin America: Results of Five Case Studies. *Inter-American Development Bank (IDB)* p 31.
- Ramírez-Villegas J, Jarvis A, Laderach P. 2013. Empirical approaches for assessing impacts of climate change on agriculture: the EcoCrop model and a case study with grain sorghum. *Agricultural and Forest Meteorology* 170: 67-78.
- Ramírez-Villegas J, Challinor A J, Thornton P, Jarvis A. 2013. Implications of regional improvement in global climate models for agricultural impact research. *Environmental Research Letters* 8 (2): 1-12.
- Heufeldt H, Jahn M, Campbell B M, Beddington J R, Declerck F, De Pinto A, Gullledge J, Hellin, J, Herrero M, Jarvis A, LeZaks D, Meinke H, Rosenstock T, Scholes M, Scholes R, Vermeulen S, Wollenberg E, Zougmore R. 2013. Beyond climate-smart agriculture: toward safe operating spaces for global food systems. *Agriculture & Food Security*: 2-12.
- Mardas N, Bellfield H, Jarvis A, Navarrete C, Comberti C. 2013. Amazonia security agenda: strengthening the water, energy, food and health security nexus in the region and beyond. *Centro Internacional de Agricultura Tropical (CIAT)*: Cali, CO 24.
- Leibing C, Signer J, Van Zonneveld M, Jarvis A, Dvorak W. 2013. Selection of provenances to adapt tropical pine forestry to climate change on the basis of climate analogs. *Forests* 4 (1): 155-178.
- Khoury C K, Greene S L, Wiersema J H, Maxted N, Jarvis A, Struik P C. 2013. An inventory of crop wild relatives of the United States. *Crops Science* 53: 1-13.
- Vermeulen S, Zougmore R, Wollenberg E, Thornton P, Nelson G, Kristjanson P, Kinyangi J, Jarvis A, Hansen J, Challinor A, Campbell B, Pramod A. 2012. Climate change, agriculture and food security: a global partnership to link research and action for low-income agricultural producers and consumers. *Current Opinion in Environmental Sustainability* 4(1):128-133

- Van den Bergh I, Ramirez J, Staver C, Turner D, Jarvis A, Brown D. 2012. Climate Change in the Subtropics: Impacts of Projected Averages and Variability on Banana Productivity. *Acta Horticulturae* (ISHS) 928: 89-99.
- Ramirez-Villegas J, Jarvi A, Touval J. 2012. Analysis of threats to South American flora and its implications for conservations. *Journal for nature conservation* 20(6): 337-348
<http://www.sciencedirect.com/science/article/pii/S1617138112000830>
- Ramirez-Villegas J, Jarvis A, Hanson J, Leibing C, Fujisaka S. 2012. Crop and Forage Genetic Resources: International Interdependence in the Face of Climate Change. In: Halewood, M., López Noriega, I, Louafi, S. (Eds.) *Crop Genetic Resources as a Global Commons: Challenges in international law and governance*. Routledge, Taylor and Francis Group, London and New York. Print ISBN: 978-0-84407-893-6; Online ISBN 978-1-84407-892-9. P 424.
- Ramirez-Villegas J, Salazar M, Jarvis A, Navarro C. 2012. A way forward on adaptation to climate change in Colombian agriculture: Perspectives towards 2050. *Climate change* 115(3-4): 611-628
<http://link.springer.com/article/10.1007%2Fs10584-012-0500-y>
- Peterson C, Nowak A, Jarvis A, Navarrete-Frias C, Figueroa A, Riano N, Vargas J. 2012. Analyzing vulnerability: A multi-dimensional approach from Colombia's Upper Cauca River Basin. *Climate Knowledge and Development Policy Brief*, November 2012. <http://cdkn.org/resource/analysing-vulnerability-a-multi-dimensional-approach-from-colombias-upper-cauca-river-basin/>
- Ocampo J, Posada P, Medina J, Jarvis A. 2012. Zonificación agroecológica y efecto del cambio climático en el cultivo de maracuyá (*P. edulis* f. *flavicarpa* Degener) en Colombia. 58th ISTH Annual Meeting Inter American Society for Tropical Horticulture. Lima, Perú. P 41
<http://www.lamolina.edu.pe/eventos/agronomia/2012/horticultura/Memorias.pdf>
- Navarrete-Frias C, Umaharan P, Debouck D, Garcia S, Fuller C, Gibson N, Jarvis A, Castañeda N, Khoury, C, Nowak A. 2012. Plant Genetic Resources: Building a Food Secure and Climate Resilient Caribbean for the Future. *CIAT Policy Brief no. 7*. Centro Internacional de Agricultura Tropical (CIAT), Cali, CO. 7 p.
<http://ciat.cgiar.org/publication/plant-genetic-resources-foundations-for-a-food-secure-and-climate-resilient-future-in-the-caribbean/>
- Mathur P N, Ramirez-Villegas J, Jarvis A. 2012. The Impacts of Climate Change on Tropical and Subtropical Horticultural Production. In: Sthapit B R, Ramanatha R V, Sthapit S R. (Eds.) *Tropical Fruit Tree Species and Climate Change*. Bioversity International, New Delhi, India. ISBN: 978-92-9043909.
- Jarvis A, Ramirez-Villegas J, Tapasco J, Navarro C, Peterson C, Zapata E, Fisher M J. 2012. Are Climate Change Adaptation and Mitigation Options Eco-Efficient? Chapter 3 In: *Issues in Tropical Agriculture. Eco Efficiency: From Vision to Reality*. International Center for Tropical Agriculture, CIAT, Cali, Colombia.
- Jarvis A, Ramirez-Villegas J, Herrera-Campo B V, Navarro-Racines C. 2012. Is cassava the answer to African climate change adaptation?. *Tropical Plant Biology* 5(1): 9-29 DOI: 10.1007/s12042-012-9096-7.
<http://rd.springer.com/article/10.1007%2Fs12042-012-9096-7>
- Vermeulen S J, Aggarwal P K, Ainslie A, Angelone C, Campbell B M, Challinor A J, Hansen J W, Ingram J S, Jarvis A, Kristjanson P, Lau C, Nelson G C, Thornton P K, Wollenberg E. 2012. Options for support to agriculture and food security under climate change. *Environmental science and policy* 15: 136-144.

- Snook L K, Dulloo M E, Jarvis A, Scheldeman X, Kneller M. 2011. Crop Germplasm Diversity: The Role of Gene Bank Collections in Facilitating Adaptation to Climate Change, Chapter 25. In *Crop Adaptation to Climate Change*, ISBN: 978-0-8138-2016-3, p 632.
- Schafleitner R, Ramirez J, Jarvis A, Evers D, Gutierrez R, Scurrah M. 2011. Adaptation of the potato crop to climate change. Chapter 11 in *Crop Adaptation to Climate Change*, ISBN: 978-0-8138-2016-3, p. 632.
- Ramirez-Villegas J, Jarvis A, Läderach P. 2011. Empirical approaches for assessing impacts of climate change on agriculture: The EcoCrop model and a case study with grain sorghum. *Agricultural and forest meteorology* 170: 67-78. <http://dx.doi.org/10.1016/j.agrformet.2011.09.005> .
- Ramirez-Villegas J, Jarvis A, Van den Bergh I, Staver C, Turner D. 2011. Changing Climates: Effects on Growing Conditions for Banana and Plantain (*Musa spp.*) and Possible Responses. Chapter 20. In *Crop Adaptation to Climate Change*, ISBN: 978-0-8138-2016-3, p. 632.
- Padulosi S, Heywood V, Hunter D, Jarvis A. 2011. Underutilized Species and Climate Change: Current Status and Outlook, Chapter 26. In *Crop Adaptation to Climate Change*, ISBN: 978-0-8138-2016-3, 632.
- Oberthür T, Läderach P, Posada H, Fisher M, Samper L F, Illera J, Collet L, Moreno E, Alarcón R, Villegas A, Usma H, Perez C, Jarvis. 2011. Regional relationships between inherent coffee quality and growing environment for denomination of origin labels in Nariño and Cauca, Colombia. *Food policy* 36: 783-794.
- Mulligan M, Fisher M, Sharma B, Xu X, Ringler C, Mahé G, Jarvis A, Ramírez-Villegas J, Clanet J C, Ogilvie A, Ahmad M. 2011. The nature and impact of climate change in the challenge program on water and food (CPWF) basins. *Water International* 36 (1): 96-124.
- Mulligan M, Saenz-Cruz L L, Pena-Arancibia J, Pandey B, Mahé G, Fisher M. 2011. Water availability and use across the Challenge Program on Water and Food (CPWF) basins. *Water International* 36(1): 17-41
- Maxted N, Kell S, Toledo Á, Dulloo E, Heywood V, Hodgkin T, Hunter D, Guarino L, Jarvis A, Ford-Lloyd B. 2011. A global approach to crop wild relative conservation: securing the gene pool for food and agriculture. *KEW BULLETIN* 65: 561–576
- Leal Filho W, Laderach P, Lundy M, Jarvis A, Ramírez-Villegas J. 2011. The Economic, Social and Political Elements of Climate Change. *Climate Change management*: 703–723, Available:<http://www.springerlink.com/index/10.1007/978-3-642-14776-0>.
- Lau C, Jarvis A, Ramírez-Villegas J. 2011. Colombian agriculture: adapting to climate change= Agricultura Colombiana: adaptación al cambio climático. Centro Internacional de Agricultura Tropical (CIAT), 2 p. Policy Brief No.1 CIAT Políticas en Síntesis No. 1
- Jiménez D, Cock J, Jarvis A, García J, Satizábal H F, Van Damme P, Pérez Uribe A, Barreto Sáenz M A. 2011. Interpretation of commercial production information: a case study of lulo (*Solanum quitoense*), an under-researched Andean fruit. *Agricultural system* 104(3): 258-270
- Jarvis A, Ramirez-Villegas J, Bonilla-Findji O, Zapata E. 2011. Impacts of Climate Change on Crop Production in Latin America, Chapter 3.1. In *Crop Adaptation to Climate Change*, ISBN: 978-0-8138-2016-3, 632.

- Jarvis A, Mulligan M. 2011. The climate of cloud forests. *Hydrological Processes* 25(3): 327-343
- Jarvis A, Méndez E. 2011. Prioritizing food security and livelihoods in climate change mitigation mechanisms: experiences and opportunities for smallholder coffee agroforestry, forest communities and REDD+. Centro Internacional de Agricultura Tropical (CIAT); Prisma, San Salvador, SV. P 8. Policy Brief
- Jarvis A, Lau C, Cook S E, Wollenberg E, Hansen J, Bonilla O, Challinor A. 2011. An integrated adaptation and mitigation framework for developing agricultural research: synergies and trade-offs. *Experimental Agriculture*. 47:185-203.
- Jarvis A. 2011. Facilitating REDD in the Amazon: tools and methodologies to inform decision making= REDD en el Amazonas: herramientas y metodologías para tomar decisiones. Centro Internacional de Agricultura Tropical (CIAT), Cali, CO. 2 p. (CIAT Hoja Informativa No. 17 CIAT Brief No. 17)
- Jarvis A. 2011. Decision and policy analysis program = Programa de análisis de políticas. Centro Internacional de Agricultura Tropical (CIAT), Cali, CO 2 p. (ClimateChange and Capacity Strengthening Research Area Área de Investigación en Cambio Climático y Fortalecimiento de Capacidades)
- Hyman G, Farrow A, Espinosa H, Giron E, Jarvis A, Kularatne J. 2011. Agricultural technology evaluation: trial metadata database and file repository. Oral Presentation at the General Research Meeting of the Generation Challenge Program. September 21-25, 2011. Hyderabad, India. http://www.generationcp.org/UserFiles2/File/GRM-2011/Presentations/24-sep-2011/Trial-sites-GIS_GHyman.pdf
- Fonte S J, González A, Graefe S, Guimaraes E P, Myman G, Jarvis A, Lavelle P, Lundy M, Peters M, Quintero M, Rao I, Tapascoco J, Etter A, Martínez C, Murgueitio E, Reis C J, Rodríguez, C.A. 2011. Strategy in action: Amazon region= Estrategia en acción: Región Amazónica. Centro Internacional de Agricultura Tropical (CIAT), Cali, CO. p 8. (CIAT Strategy in action No. 2 CIAT Estrategia en acción No. 2)
- Fonte S J, González A, Graefe S, Guimaraes E, Perpétuo M G, Jarvis, A.; Lavelle, P.; Lundy, M.; Peters, M.; Quintero, M.; Rao, I.; Tapascoco, J.; Etter, A.; Martínez, C.; Murgueitio, R., E.; Reis, C. J.; Rodríguez, C.A. 2011. Strategy in action a bridged version: Amazon region eco-efficient landscapes = Estrategia en acción versión abreviada: Región Amazónica paisajes eco-eficientes. Centro Internacional de Agricultura Tropical (CIAT), p 2. (CIAT Strategy in action No. 2 (abridged version) CIAT Estrategia en acción No. 2 (versión abreviada)
- Ceballos H, Ramirez-Villegas J, Bellotti A, Jarvis A, Alvarez E. 2011. Adaptation of Cassava to Changing Climates. Chapter 19. In *Crop Adaptation to Climate Change*, ISBN: 978-0-8138-2016-3, p 632.
- Beebe S, Ramirez-Villegas J, Jarvis A, Idupulapati M R, Mosquera G, Bueno J M, Blair M. 2011. Genetic Improvement of Common Beans and the Challenges of Climate Change Chapter 16. In *Crop Adaptation to Climate Change*, ISBN: 978-0-8138-2016-3, p 632.
- Van Zonneveld M, Jarvis A, Dvorak W, Lema G, Leibing C. 2009. Climate change Impact predictions on *Pinus patula* and *pinus tecunumanii* populations in Mexico and Central America, *Forest Ecology and Management* 257(7): 1566-1576.
- Van Zonneveld M, Koskela J, Vinceti B, Jarvis A. 2009. Impact of climate change on the distribution of tropical pines in Southeast Asia: *Unasylva* 60: 24-29

- Leibing C, Van Zonneveld M, Jarvis A, Dvorak W. 2009. Adaptation of tropical and subtropical pine plantation forestry to climate change: Realignment of *Pinus patula* and *Pinus tecunumanii* genotypes to 2020 planting site climates: *Scandinavian Journal of Forest Research* 24: 483-493.
- Jimenez D, Cockd J, Satizabal H, Barreto M A, Perez A, Jarvis A, Van Damme P. 2009. Analysis of Andean blackberry (*Rubus glaucus*) production models obtained by means of artificial neural networks exploiting information collected by small-scale growers in Colombia and publicly available meteorological data: *Computers and Electronics in Agriculture* 69 (2) :198-208.
- Jarvis A, Touval J L, Castro M, Sotomayor L, Hyman G G. 2009. Assessment of threats to ecosystems in South America, *Journal for Nature Conservation* 18(3): 180-188. <http://dx.doi.org/10.1016/j.jnc.2009.08.003>.
- Jarvis A, Lane A, Hijmans R. 2008. The effect of climate change on crop wild relatives, *Agriculture, Ecosystem and Environment* 126 (Issues 1-2): p. 13-23.
- Lane A, Jarvis A. 2007. Changes in Climate will modify the Geography of Crop Suitability: Agricultural Biodiversity can help with Adaptation. *Journal of the Semi-Arid Tropics* 4 (1).
- Yeaman S, Jarvis A. 2006. Regional heterogeneity and gene flow maintain variance in a quantitative trait within populations of lodgepole pine. *Proceedings of the Royal Society B: Biological Sciences* 273(1594): 1587-1593.
- Jarvis A, Yeaman S, Guarino L, Tohme J. (2005). The role of geographic analysis in locating, understanding and using plant genetic diversity. In Zimmer E A, Roalson E H. (eds), *Methods in Enzymology*, Vol. 395 *Molecular Evolution: Producing the Biochemical Evidence Part B*, Elsevier, New York, USA p.279-298.
- Jarvis A, Williams K, Williams D, Guarino L, Caballero P, Mottram G. 2005. Use of GIS for optimizing a collecting mission for a rare wild pepper (*Capsicum flexuosum* Sentn.) in Paraguay. *Genetic Resource and Crop Evolution* 52: 671-682.
- Hijmans RJ, Cameron S E, Parra J L, Jones P G, Jarvis, A. 2005. WorldClim - very high resolution global terrestrial climate surfaces for monthly temperature and precipitation, *International Journal of Climatology* 25: 1965-1978.
- Jarvis A, Ferguson M, Williams D, Guarino L, Jones P, Stalker H, Valls J, Pittman R, Simpson C, Bramel P. 2003. Biogeography of Wild *Arachis*: Assessing Conservation Status and Setting Future Priorities. *Crop Science* 43: 1100-1108.
- Jarvis A, Guarino L, Williams D, Williams K, Hyman G. 2002. Spatial analysis of wild peanut distributions and the implications for plant genetic resource conservation. *Plant Genetic Resources Newsletter* 131: 29-35.
- subtropical pine plantation forestry to climate change: Realignment of *Pinus patula* and *Pinus tecunumanii* genotypes to 2020 planting site climates: *Scandinavian Journal of Forest Research* 24: 483-493.
- Van Zonneveld, M., Koskela, J., Vinceti, B., and Jarvis, A., 2009, Impact of climate change on the distribution of tropical pines in Southeast Asia: *Unasylva* 60: 24-29

- Van Zonneveld, M.; Jarvis, A.; Dvorak, W.; Lema, G.; Leibing, C. 2009. Climate change Impact predictions on *Pinus patula* and *pinus tecunumanii* populations in Mexico and Central America. *Forest Ecology and Management* 257(7): 1566-1576.
- Jarvis, A., Lane A., Hijmans R., 2008, The effect of climate change on crop wild relatives, *Agriculture, Ecosystem and Environment* 126 (1-2): 13-23.
- Lane, A; Jarvis, A. 2007. Changes in Climate will Modify the Geography of Crop Suitability: Agricultural Biodiversity can Help with Adaptation.. *Journal of the Semi-Arid Tropics* 4(1).
- Jarvis, A.; Ferguson, M.; Williams, D.; Guarino, L.; Jones, P.; Stalker, H.; Valls, J.; Pittman, R.; Simpson, C.; Bramel, P. 2003. Biogeography of Wild *Arachis*: Assessing Conservation Status and Setting Future Priorities. *Crop Science* 43: 1100-1108.
- Jarvis, A., Williams, K., Williams, D., Guarino, L., Caballero, P. & Mottram, G. (2005). Use of GIS for optimizing a collecting mission for a rare wild pepper (*Capsicum flexuosum* Sentn.) in Paraguay. *Genetic Resource and Crop Evolution* 52: 671-682.
- Jarvis, A., Yeaman, S., Guarino, L., Tohme, J. (2005). The role of geographic analysis in locating, understanding and using plant genetic diversity. In Zimmer E A.. and Roalson E.H. (eds), *Methods in Enzymology*, Vol. 395 *Molecular Evolution: Producing the Biochemical Evidence Part B*, Elsevier, New York, USA p.279-298.
- Jarvis, A.; Guarino, L.; Williams, D.; Williams, K.; Hyman, G. 2002. Spatial analysis of wild peanut distributions and the implications for plant genetic resource conservation. *Plant Genetic Resources Newsletter* 131, 29-35.
- Hijmans, R.J., S. Cameron, J. Parra, P.G. Jones, A. Jarvis, 2005, WorldClim - very high resolution global terrestrial climate surfaces for monthly temperature and precipitation, *International Journal of Climatology* 25, p. 1965-1978.
- Yeaman, S. and Jarvis, A. 2006. Regional heterogeneity and gene flow maintain variance in a quantitative trait within populations of lodgepole pine. *Proceedings of the Royal Society B: Biological Sciences* 273: 1587-1593.