



**DRAFT Environmental and Social Impact
Assessment Report for the Yara Dallol
Potash Project**

Yara Dallol Potash Project, Danakil Depression, Ethiopia

December 2014

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Yara Dallol BV

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Potash Project**

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Date: December 2014

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LIST OF ACRONYMS

| Abbreviation | Full Definition |
|---------------------|--|
| °C | Degrees Celsius |
| ¹⁸ O | Oxygen Isotope |
| ² H or D | Hydrogen Isotope Deuterium |
| AB | Anhydrite Bed |
| ABL | Assessment Background Level |
| AD | Anno Domini |
| AERMOD | American Meteorological Society/Environmental Protection Agency Regulatory Model |
| Al | Aluminum |
| ALARP | As low as Reasonably Practicable |
| AMREF | African Medical Research and Education Foundation |
| ANRS | Afar National Regional State |
| AoI | Areas of Influence |
| ARCCH | Authority for Research and Conversation of Cultural Heritage |
| ARVs | Antiretrovirals |
| AQMP | Air Quality Management Plan |
| AQP | Air Quality Monitoring point |
| AQS | Air Quality Standard |
| As | Arsenic |
| B | Boron |
| BBOP | Business and Biodiversity Offsets Programme |
| BC | Before Christ |
| BDL | Below Laboratory Detection Limit |
| BID | Background Information Document |
| BOD | Biological Oxygen Demand |
| BOMP | Biodiversity Offset Management Plan |
| Ca | Calcium |
| CaCO ₃ | Carbonate Alkalinity |
| CaCO ₃ | Bicarbonate Alkalinity |
| CaCO ₃ | Total Alkalinity |
| Ca-HCO ₃ | Calcium Bicarbonate |
| Ca-SO ₄ | Calcium Sulphate |
| CAPEX | Capital Expenditure |
| CBD | Convention on Biological Diversity |
| CBE | Charge Balance Error |
| Cd | Cadmium |
| CHMP | Cultural Heritage Management Plan |
| CHPs | Certified Health Professionals |
| CI | Conservation Important |
| CITES | Convention on International Trade in Endangered Species |
| CLO | Community Liaison Officer |
| CN | Cyanide |
| Co | Cobalt |
| COD | Chemical Oxygen Demand |
| CO ₂ | Carbon Dioxide |
| Cr(VI) | Chrome 6 |
| CSA | Central Statistics Agency of Ethiopia |
| Cu | Copper |
| dB | Decibels |
| DOH | Depth of Borehole/Well |
| DTW | Dallol Test Well |
| DUP | Duplicate sample |
| DMRB | Design Manual for Roads and Bridges |
| EA | Environmental Assessment |
| EC | Electrical Conductivity |

| Abbreviation | Full Definition |
|--------------------------------|--|
| EEP | Ethiopian Electric Power |
| EGSECE | Ethiopian General Secondary Education Certificate Examination |
| EHS | Environmental, Health and Safety |
| EIA | Environmental Impact Assessment |
| EITI | Extractive Industries Transparency Initiative |
| EMP | Environmental Management Plan |
| EN | Endangered with Extinction |
| ERP | Emergency Response Plan |
| EPA | Environmental Protection Authority |
| EPFIs | Equator Principle Financial Institutions |
| EPRDF | Ethiopian People's Revolutionary Democratic Front |
| EPs | Equator Principles |
| ERA | Ethiopian Road Authority |
| ERM | Environmental Resources Management Southern Africa (Pty) Ltd. |
| ESDPRP | Ethiopian Sustainable Development & Poverty Reduction Programme |
| ESIA | Environmental and Social Impact Assessment |
| ES-MS | Environmental and Social Management System |
| ESSD | Environmental and Social Studies Consultant |
| EWCA | Ethiopian Wildlife Conservation Authority |
| F | Fluoride |
| FDRE | Federal Democratic Republic of Ethiopia |
| Fe | Iron |
| FGC | Female Genital Cutting |
| FGD | Focus Group Discussions |
| FHH | Female Headed Households |
| FPIC | Free, Prior, and Informed Consent |
| GDP | Gross Domestic Product |
| GHG | Greenhouse Gases |
| GIS | Geographic Information System |
| GMWL | Global Meteoric Water Line |
| GNI | Gross National Income |
| GNIP | Global Network of Isotopes in Precipitation |
| GoE | Government of Ethiopia |
| GPS | Global Positioning System |
| GRI | Global Reporting Initiative |
| GTP | Growth and Transformation Plan (2010/11 to 2014/15) |
| HCO ₃ | Hydrogen Carbonate |
| HEW | Health Extension Worker |
| HIV/AIDS | Human Immunodeficiency Virus / Acquired Immune Deficiency Syndrome |
| Hf | Halite Formation |
| Hg | Mercury |
| HR | Human Resources |
| HSE | Health & Safety and Environment |
| IA | Impact Assessment |
| IAEA | International Atomic Energy Agency |
| ICP | Informed Consultation and Participation |
| IFC | International Financing Corporation |
| ILO | Internal Labour Organisations |
| IPCC | Intergovernmental Panel on Climate Change |
| ISL | <i>In-situ</i> Leaching |
| ISR | <i>In-situ</i> Recovery |
| IT | Information Technology |
| ITCZ | Intertropical Convergence Zone |
| K | Potassium |
| K ₂ SO ₄ | Sulphate of Potash |
| KA | Kebele Administration |
| KCl | Potassium Chloride |
| KII | Key Informant Interviews |

| Abbreviation | Full Definition |
|--------------------------------|---|
| KOPs | Key Observation Points |
| KPIs | Key Performance Indicators |
| Ktpa | Kilo-tons per annum |
| LAeq | Equivalent Continuous Level |
| LC | Least Concern |
| LMWL | Local Meteoric Water Line |
| LRF | Livelihood Restoration Framework |
| LRP | Livelihood Restoration Plan |
| mamsl | Meters above mean sea level |
| MAP | Mean Annual Precipitation |
| m bgl | Meters Below Ground Level |
| mbrp | Meters Below Reference Point (top of casing) |
| MDG | Millennium Development Goal |
| Mg | Magnesium |
| M _g SO ₄ | Sulphate of Potash |
| M _g Cl ₂ | Magnesium Chloride |
| Mn | Manganese |
| Mo | Molybdenum |
| MoEF | Ministry of Environmental Protection and Authority |
| MoM | The Ethiopian Ministry of Mines |
| MOP | Muriate of Potash |
| mtph | Metric Tons Per Hour |
| mV | Milli-Volts |
| mS/m | Milli-Siemens per Meter |
| MWL | Meteoric Water Line |
| Na | Sodium |
| NA | Not Analysed |
| NA | Not Applicable |
| NaCl | Sodium Chloride |
| NASA | National Aeronautics and Space Agency |
| Na-SO ₄ | Sodium Sulphate |
| NGOs | Non-Governmental Organizations |
| NM | Not Measured |
| NMP | Noise Management Plan |
| N2 | Ethiopian National Highway 2 |
| Ni | Nickel |
| NO ₂ | Nitrous Dioxide |
| NO ₃ | Nitrate |
| NO _x | Oxides of Nitrogen |
| NPi | National Pollutant Inventory |
| NPK | Nitrogen Phosphate and Potassium |
| NS | No Health-based guideline value is proposed |
| NSR's | Noise Sensitive Receptors |
| NT | Near Threatened |
| NTFPs | Non-timber Forest Products |
| NTO | National Tourism Operator and Travel Agency |
| NTS | Non-technical Summary |
| OHS | Occupational Health & Safety |
| OHTL | Electrical Overhead Transmission Line |
| OPEX | Operational Expenditure |
| ORP | Oxidation - Reduction Potential |
| PASDEP | Plan for Accelerated and Sustained Development to End Poverty (from 2005/06 to 2009/10) |
| Pb | Lead |
| PC | Process Contribution |
| PEC | Predicted Environmental Concentration |
| pH | Power of Hydrogen |
| PIIM | Project Induced In-Migration |
| PLA | Participatory Learning and Action |
| pMC | Radiocarbon Age (fraction modern) |

| Abbreviation | Full Definition |
|-------------------|---|
| PM | Particulate Matter |
| PM _{2.5} | Particulate matter which passes through a size-selective inlet with a 50% efficiency cut-off at 2.5 µm aerodynamic diameter |
| PM ₁₀ | Particulate matter which passes through a size-selective inlet with a 50% efficiency cut-off at 10 µm aerodynamic diameter |
| PNL | Predicted Project Noise Levels |
| PO4 | Ortho phosphate |
| PPE | Personal Protective Equipment |
| PPV | Peak Particle Velocity |
| PRA | Participatory Rural Appraisal |
| PSLCE | Primary School Leaving Certification Examination |
| PSNC | Project Specific Noise Criteria |
| PSNP | Productive Safety Net Program |
| PSs | Performance Standards |
| Qaf1 | Quaternary Alluvial Fan 1 |
| Qaf2 | Quaternary Alluvial Fan 2 |
| Qb | Quaternary Basalt |
| QC | Quality control |
| Qs | Mudflat Sediment |
| RCYBP | Radiocarbon Years Before Present |
| RPDs | Relative percentage differences |
| RTAs | Road Traffic Accidents |
| SDPASE | Sustainable Development of the Protected Areas System of Ethiopia |
| Se | Selenium |
| SEP | Stakeholder Engagement Plan |
| SIA | Social Impact Assessment |
| SLM | Sound Level Meter |
| SME | Small Medium Enterprise |
| SMOW | Standard Mean Ocean Water |
| SO ₂ | Sulphur Dioxide |
| SOP | Sulphate of Potash |
| Sp | Solfatra |
| SPCCP | Spill Prevention, Control and Containment Plan |
| SSA | Socio-Economic Study Area |
| STIs | Sexually Transmitted Infections |
| SWL | Static Water Level |
| T | Temperature |
| TB | Tuberculosis |
| TDR | Time Domain Reflectometry |
| TDS | Total Dissolved Solids |
| TMA | Tailings Management Area |
| ToR | Terms of Reference |
| TSP | Total Suspended Particulates |
| TSS | Total Suspended Solids |
| TU | Tritium Units |
| TVET | Technical and Vocational Education and Training |
| U | Uranium |
| UNDP | United Nations Development Programme |
| UNHCR | United Nations High Commissioner for Refugees |
| URI | Upper Respiratory Infection |
| USEPA | United States Environmental Protection agency |
| USGS | United States Geological Survey |
| V | Vanadium |
| VP | Viewpoints |
| VSP | Vertical Seismic Profiling |
| VU | Vulnerable to Extinction |
| WAD | Weak Acid Dissociable |
| WHO | World Health Organization |
| WMO | World Meteorological Organization |
| WMP | Waste Management Plan |

| Abbreviation | Full Definition |
|--------------|---|
| WWDSE | Water Works Design and Supervision Enterprise |
| Zn | Zinc |
| ZTV | Zone of Theoretical Visibility |