1. **Forests and SDG 1 – End poverty in all its forms everywhere**

Forests and trees are vital sources of income and livelihoods for rural populations, especially for indigenous peoples and those living in close proximity to forests and for small holders, both women and men, with trees on communal or private lands. For people employed in both the formal- and informal forest sector they provide a direct income-generating activity, including timber growers, wood processors and various related small and medium-sized forest enterprises. For many others, forests and trees are important livelihood components, not least, for the estimated 2.5 billion people involved in smallholder agriculture (IFAD 2013), of which most benefit from regulatory and provisioning ecosystem services [[1]](#footnote-1)of trees in the landscape.

**The relative importance of forest products: The case of Uganda**

Field research in eight villages within the four districts of Kibaale, Masindi, Kumi and Lamwo in Uganda revealed a large dependency on forest products by local households. Fuelwood and charcoal were the most important products for household economies, accounting for 36% of all cash sales. Building materials contributed another 30% of sales, while forest foods represented 21%. The relative importance of income from the sale of forest products was however dwarfed by the domestic use of forest products. All in all the non-cash values of forest products were two to four times higher than their cash values to the local population. Still, forest products have a significant value to the national economy. The energy from forest products consumed by rural people represent a value three times as large as Uganda’s energy budget. Forests have also been important resources in the post-conflict reconstruction in the Northern and Eastern regions when people were returning home after escaping violent conflict. Households in these regions had a larger average forest dependency than the other districts, with a total calculated “extra” value derived from forests of an additional US$870 million dollars per annum.

*Source: Shepherd et al (2013)*

In order to end poverty by 2030 a focused attention on rural livelihoods and the ways forests and trees support these is essential. Numerous studies have showcased the benefits poor households derive from the consumption of forest products. The direct sale of non-wood forest products (NWFPs) provide households with cash that can be used to meet food expenditures and other needs. While these are important livelihood strategies, the non‐cash economic contributions of forests (including fuelwood, fodder, building materials, foods and medicinal plants collected freely for home consumption and subsistence use) to household and national economies represent the largest direct benefit of forest products. Where country‐ and region‐specific data exist, they indicate that the non-cash value of forest products range between three and five times the formally recognized cash contributions (Agrawal et al 2013).

1. **Quantifying how forests matter for SDG 1**

Overall forests have three different roles in the livelihoods of the rural poor: by supporting current consumption, by providing valuable safety nets and by providing a possible pathway out of poverty (Cavendish 2003). As an indicator to measure the contribution of forests for supporting poor households’ consumption, the share of income arriving from forest resources among the rural poor was considered. Previous studies have quantified the environmental income [[2]](#footnote-2)of rural households as a major livelihood source, whose negligence would severely exaggerate rural poverty (Angelsen et al 2014). To measure the contribution of forests as safety nets the role of trees in anticipatory and reactive adaptation to shocks for rural populations is used as an indicator. The provisioning and regulating services of trees in creating resilient livelihoods have been documented in numerous case studies. To give a hint of the potential magnitude of the use of tree-based livelihoods in creating resilient landscapes, an indicator of the number of hectares under agroforestry practices is used.

The possibility of forests as a pathway out of poverty remains somewhat more ambiguous. Access to basic services and land rights is a critical component for making long-term investments to raise productivity. The indicator for this is the proportion of forests under ownership of local communities and individuals. Finally, the spatial distribution of poverty in relation to forests is very important. As the poorest households tend to have a relative larger dependency on forest resources for their livelihoods. the overlap between forest cover and high poverty rates is examined. The indicator used measures the proportion of rural people living on less than $1.25 a day residing in the proximity of forests. The table below summarizes the four indicators to quantify the contribution of forests to SDG 1.

|  |  |
| --- | --- |
| SDG 1 target | SOFO indicator |
| 1.1 By 2030, eradicate extreme poverty for all people everywhere, currently measured as people living on less than $1.25 a day | 1.1.1 Proportion of rural people living on less than $1.25 a day residing in or around forests  1.1.2 Share of income arriving from forest resources among the rural poor |
| 1.4 By 2030, ensure that all men and women, in particular the poor and the vulnerable, have equal rights to economic resources, as well as access to basic services, ownership and control over land […] | 1.4.1 Proportion of forests with secure tenure rights for local communities and other forest dependent people |
| 1.5 By 2030, build the resilience of the poor and those in vulnerable situations and reduce their exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters | 1.5.1 # number of hectares under agroforestry practices as a contribution to resilience of the poor |

* 1. **Proportion of rural people living on less than $1.25 a day residing in proximity of forests**

What is the association between forest cover and rural poverty? Roughly, 820 million rural people in the tropics live in such landscapes in or near forests and savannas (De Leeuw 2007). These numbers give an indication of a strong potential role of trees and forests for rural livelihoods, despite the difficulties in aggregating forest dependency data. Out of these, only a minority can be found inside dense forests. Most forest dependent people are instead found in mosaic landscapes of farmland and trees or in the frontier along the forest edges. These ecosystems can support a much larger population density than dense forests. While areas with high forest cover typically have a low number of people living there the rate of poverty in these areas tends to be high In countries where reliable poverty and population data are available, a positive association between high forest cover and high poverty rates has been identified.

What is the explanation for this association? Forest areas suffer from one common denominator: remoteness. With increased distances to urban centres and markets, transaction costs rise, which erode the (already low) margins for most forest products., Governance and rights in remote areas tend to be weak. Agricultural lands are associated with stronger tenure rights for local people than are forests. Without secure ownership over land and use rights, there is little potential for households to accumulate assets to increase their income over time. It is worth keeping in mind that poverty levels can also vary significantly within short distances. In a rural district in Ghana, poverty rose by 20% for villagers living 20 km from the market as compared to those in closer proximity (Shepherd 2012).

**Forest cover and poverty overlap in the tropics: spatial association from seven countries**

By overlaying forest cover with poverty and population data for Brazil, Honduras, Malawi, Mozambique, Uganda, Indonesia and Vietnam, researchers were able to find a spatial association pattern in the distribution of poverty. By classifying areas as either high/low forest cover and with high/low poverty rates, forest and poverty maps were created. Though there are significant deviations between the countries, two main findings stand out. First, there is a strong association between areas of high forest cover and high poverty rates. In Brazil, a little more than 70% of the closed forest areas (crown cover >40%) had a high rate of poverty. Secondly, high forest cover areas were associated with a low poverty density. Even if these areas had a large percentage of poor people, the absolute numbers were relative low. Only a small percentage of the countries’ populations of poor people lived in areas characterized as high forest cover and high poverty rate, from a low of about 3% for Uganda and Indonesia to about 12% for Vietnam.

*Source: Sunderlin et al (2007)*

What is the proportion of people living on less than $1.25 that can be found around forests? Using available rural poverty rates for 43 tropical countries (IFAD 2016) and regional average rural poverty rates for countries with missing data, the total rural population below the extreme poverty line in these countries comes to 638 million people. Using the same poverty rates for the population in proximity of forests it is possible to compare these numbers with the total rural poor population. Figure 1 presents these numbers disaggregated for Africa, Latin America and Asia. On average 39% of the rural extreme poor are estimated to be found in forest and savannah areas. As this is based on average rural poverty rates, these proportions should be viewed as a general estimation rather than exact numbers. It should also be noted that this is likely an underestimation due to the higher poverty rate found in forest areas. What can further be seen is that there are large regional differences. In Latin America the vast majority of the rural poor population can be found in forested landscapes, while this shrinks to less than one third in Asia. In total, forests host two thirds of extreme poor population and savannah landscapes one third. However, this share is extremely unevenly spread, with almost 99% of the extreme poor living in savannahs found in Africa. If savannah landscapes are excluded, the proportion of the extreme poor in proximity of forests drops from 50% to 34% for Africa and from 39% to 17% for the Tropics as a whole.

Figure 1: Proportion of rural people living on less than $1.25 a day residing in or around forests and savannahs. Source: Own calculations based on IFAD (2016) and Chomitz (2007)

The proportion does however not tell us about the real number of people living on less than $1.25 a day and their distribution. Figure 3 shows this relationship for the same regions. Out of an estimated 251 million people in forests and savannahs below the extreme poverty line, 63% can be found in Africa and 34% in Asia. Notably only 3%, or 7.8 million people, live in Latin American countries, even if this represents 82% of the rural extreme poor in these countries. This can be explained by a much lower poverty rates in Latin America compared to the other two regions. If savannahs are excluded, this increase slightly up to 5%, while the share of Asia goes up to 59% and is reduced to 36% for Africa.

Figure 2: Distribution of the total number of 251 million rural people living on less than $1.25 a day residing in or around forests and savannahs. Source: calculations based on IFAD (2016) and Chomitz (2007)

* 1. **Share of income coming from forest resources among the rural poor**

If the rural poor to a large degree have some sort of forest dependency and if forest areas are prone to high poverty rates how do forest resources support rural households? Much more than a coping mechanisms in times of crisis, forests are a major part of rural diversified livelihoods. The role of forests in reducing long-term poverty has however been found to be much more complex – and with the exception of a few specialized NWFPs - the potential for intensifying the production of forest products as a way out of poverty has been limited. This is largely due to the current economy of NWFPs that are mainly collected or cultivated in remote areas with low yields of return.

Across five African countries, trees contributed to an average 17% of gross income for those households with at least one tree on their land (Miller et al 2016). In a meta-analysis of 51 case studies from 17 countries, forest income represented on average 22% of the total income for the population sampled (Vedeld et al 2007). The most comprehensive measure of rural environmental income to-date is the Poverty Environment Network (PEN), which household-level surveys at 58 sites, 333 villages, and 7,978 households within tropical or sub-tropical regions of Asia, Africa, or Latin America. On average environmental income (cash and subsistence) accounted for 28% of total household income, while this was reduced to 22% if excluding non-forest resources (Angelsen et al 2014). Environmental income was found to be only marginally less important than crop income for households, thus emphasizing the reliance on natural resources for rural livelihoods. Notably, in absolute numbers, forest income rose for sites with higher income-levels, which shows that forests are not only a resort for the poorest communities. However, in relative terms, forest income played a more important role in the livelihoods of the poorest households as a share of total income across sites. Across regions, Latin America and Southern Africa are associated with a higher degree of relative forest income, while lower dependency has been found in East Africa and Asia (Vedeld et al 2007). For many African sites, this could be explained by a higher reliance on products collected from open savannahs, bushlands, and other non-forest lands. For the absolute poorest households living on less than US$1.25 a day, this relationship looks the same: a slightly lower share of forest income, but with a higher reliance on non-forest environmental resources. If income from forests were to be excluded from rural livelihood portfolios, it would have a severe effect on poverty rates. For the PEN-sites, it would push 9% of the sampled households below the extreme poverty line (Noack et al 2015).

**Environmental income and inequality in rural Zimbabwe**

In a pioneering study of environmental resources for rural livelihoods, the inclusion of environmental income (in a broad sense beyond forest resources) was found to dramatically reduce estimates of poverty and inequality. For poverty measures, the inclusion of environmental income reduced poverty rates by 50% or more as compared to conventionally income measures. Likewise, rural inequality was brought down roughly 30% with the equalizing effect of environmental income. Despite these significant effects, environmental income made almost no difference on the cause of poverty and inequality, which was rather determined by households’ access to formal labour markets. Substantial entry barriers to employment and sustained improvement in agricultural yields risked keeping poor households stuck in a dependency on environmental resources and other free-entry activities with low labour returns.

*Source: Cavendish (1999)*

The data cited demonstrate the overlap between forests and the extreme poor and the relatively high level of dependence on forests for subsistence and cash but do not adequately explain either the persistence of poverty of forest dependent peoples nor the significant potential for poverty reduction forests can play. This can be more properly explained by clarifying the significant barriers in place in many parts of the world for the extreme poor to freely access and use forests, to participate in their sustainable management and to take full advantage of the opportunities to trade, market and add value to forests products and environmental services. Many of these barriers are particularly difficult for women and marginalized communities. For these barriers to be removed, supportive policies are needed to secure tenure and access rights, to help groups to organize, enhance their management planning, improve their ability to access markets, add value and influence decision makers and participate in policy development, implementation and monitoring. Much more explicit attention is needed to ensure that forest dependent poor are not excluded from all of the other anti-poverty programmes and opportunities because of the remoteness of their settlements and a long history of efforts by the state and other authorities to prioritize national income and development objectives over local poverty reduction. The poor have mostly been seen as the problem not part of the solution.

* 1. **Proportion of forests with secure tenure rights for local communities and other forest dependent people**

Clear and secure tenure rights are recognized as an important prerequisite for the sustainable management of natural resources. Tenure, as a “bundle of rights”, is at minimum the right to access, the right to make management decisions and the right to withdraw resources from a particular area. In countries across Latin America, Africa and Asia where such rights are effectively enforced, they have been associated with lower deforestation rates and as pre-conditions for cost-effective community led climate change mitigation options (Stevens et al 2014, Ding et al 2016). Tenure rights for local communities have also brought substantial livelihood benefits especially in combination with other measures to target the poorest members of communities, as shown from 30 years of community forest user groups in Nepal (Hobley, Mary, 2017) or the proliferation of small-scale timber enterprises in Mexico. Secure tenure also reduces the risk of forest conversion and diversion of both cash and subsistence benefits on which the poorest depend.

The global trend over the last two decades is one of decentralization of forest tenure from national governments to local communities and private ownership. Recognition of community tenure rights has been mainly taking place in low and middle-income countries (LMICs), predominantly in Latin America. Still, public ownership accounted for 76% of all forestland in 2010, or 3,040 million hectares (FAO 2015). Comparing tenure data is challenging due to differences in methodology and definitions used between various sources. As of 2013, 416 million hectares of the world’s forests were under community ownership in 52 countries representing nearly 90% of the global forest area (RRI 2014), while individuals and firms owned another 397 million hectares. These are higher numbers than FAO reports, which rely on official country statistics. The spread of devolution of tenure rights is also extremely uneven across countries and regions. In Africa, governments hold on to almost all of the land, with only marginal ownership rights designated to local communities, while Latin American countries have implemented significant forest tenure reforms where governments now administer less than half of the forests (Ibid).

Table 1 gives a range of forests under different ownership types based on FAO (2015) and RRI (2014) data. It is important to remember that these numbers only include statutory land that has been legally recognized. Substantial amounts of land are *de facto* managed by local communities and Indigenous Peoples but without legal recognition, especially across Africa where customary land rights prevail. It also excludes land that are designated and partially under community control, which can be close to another 100 million hectares of forestland. All in all the real proportion of forests under community and smallholder management is significantly higher, and can be as high as up to 28% of the world’s forest area (Gilmour 2016).

|  |  |  |
| --- | --- | --- |
| Forest ownership modality | Hectares (millions) | Share of global forest area |
| Public forests (FAO)  Public forests (RRI\*) | 3,039  2,410 | 76%  60.2% |
| Individually owned forests (FAO)  Individually owned forests (RRI) | 448  397 | 11.2%  9.9% |
| Community owned forests (FAO)  Community owned forests (RRI) | 120  416 | 3%  10.4% |
| Community owned forests + individually owned forests (FAO)  Community owned forests + individually owned forests (RRI) | 568  813 | 14.2%  20.3% |

*Table 1: Forest ownership. Source: FAO (2015) and RRI (2014)*

*\*Based on data from 52 countries, excluding land partially owned or designated to local communities. Data on individually owned forests include forests owned by firms whereas FAO data does not.*

* 1. **Number of hectares under agroforestry practices as a contribution to resilience of the poor**

Forests and trees outside forests, especially on farms and landscape mosaics including grazing and common lands also play a vital role as safety nets to increase the resilience of the poor to major disasters and even climate change. First, biomass stocks (such as trees) are less susceptible to weather shocks than production depending essentially on annual biomass growth (non-perennial crops), because regrowth fluctuations can average out over the years. Natural ecosystems are also more diverse than agricultural systems, which creates more stability (Noack et al 2015). Secondly, forest extraction has low or no entry costs, which makes it attractive for the asset poor, for example after loss of property after extreme weather events. Thirdly, diverse forest products are often available at times when other income sources are not (Fisher et al 2010).

Research has shown that the extraction of forest resources in rural communities tend to increase in the aftermath of shocks. This is more so the case for covariate shocks that effect the whole community, than for idiosyncratic shocks that affect a single household only (Wunder et al 2014). It is the most asset poor households that have the largest reliance on an increased use of forest resources, as these households generally have fewer other income earning opportunities and social kinships to turn to for assistance. However, despite their importance for rural livelihoods, forests are not the primary response strategy to shocks. Reducing consumption, finding alternative work, seeking external assistance and selling assets all appear as responses that are more important.

How important are forests and trees on farms in a variety of agroforestry systems that combine tree and crop or livestock production for adapting resilient livelihoods? One third of smallholder farmers in five African countries were found to cultivate trees on their land, in turn linked to improved livelihoods for those households (Miller et al 2016). Across the East African drylands, trees contribute to resilient livelihoods for farmers through a variety of ecosystem goods and services (De Leeuw et al 2014). By creating diversified livelihoods, providing natural capital and regulating ecosystem services, trees in agroforestry systems increase the overall resilience of the landscape as a whole, witnessed in agroforestry systems. Still, tree-based activities likely represent a small but important proportion of rural anticipatory strategies. Research from rural Malawi showed that only 3% of households reported using forest diversification to prepare for climate variability, well below other measures such as agricultural modification and crop diversification (Fisher et al 2010).

Trees are widely spread over agricultural land, with the highest tree cover found in the humid regions of Southeast Asia, Central America, eastern South America and coastal West Africa. Apart from broadly following precipitation patterns, tree cover appear anecdotal, rooted in local ecology and traditions. Likewise, agroforestry practises wary greatly in their form and the interaction of trees in the landscape. Figure 3 presents the percentage of agricultural area globally with different levels of tree cover on them as reported by ICRAF (Zomer et al 2009). These numbers should not be read as thresholds of what account of agroforestry landscapes, but give an estimation of the incorporation of trees in predominantly agricultural areas. Further, it does not tell us about the actual practises of agroforestry on the land, thus it can be everything in between highly integrated systems to a hard boundary between a forest and adjunct croplands. Therefore, the conclusions drawn from the data should be treated with some caution, but point to the potential of agroforestry systems.

Out of the area classified as agricultural (22,183,204 km²) 46% have a canopy cover of at least 10%. This drops down to 27% for the 20% canopy cover and 7.5% for areas with at least 50% canopy cover. For the 10% threshold, this equals to slightly more than 1 billion hectares worldwide. Again it should be noted that parts of these areas will be under little or no agricultural production (globally 1.6 billion hectares are estimated to be under cultivation), but the potential magnitude of agroforestry systems is still extensive.

Figure 3: Percentage of agricultural area with tree cover. Source: Adapted from Zomer et al (2009)

1. **Key Messages**

Areas with high forest cover tend to have historically high poverty rates. Even if by far not everyone living around forests are poor, they are a hotspot for poverty across the tropics. The role of forests as a safety net and substantial source of subsistence needs which would otherwise have to be purchased remains under emphasized. Simultaneously a significant proportion of the potential contribution of forests to the poorest of the poor remains un-realized. The hurdles that keep people from benefiting from these resources are what keep poverty rates high: remoteness from markets and investments, weak rights and governance, a lack of ownership over land, unclear access rights to forest products, a lack of services and investment and weak or non existent representative organizations. If these hurdles were addressed forests and trees could play a significant larger part in achieving SDG 1 to end poverty everywhere.

Data gaps exist to fully measure the relationship between forests and poverty. First, updated geospatial poverty data at district level, as well as better gender-disaggregated data, are needed to understand the distribution of rural poverty. As urbanization and migration continue, it would be important to fully track these trends and their effects on rural areas. Secondly, there is a need for disaggregated forest tenure data on the ownership of individuals. This would allow us to break down the share of smallholder forest owners vis-à-vis largescale forest holders. Likewise, data on tenure and livelihoods is largely missing and existing data is not disaggregated by gender or ethnicity. Together they would allow for a more comprehensive analysis of the relationship between forest ownership and local wellbeing.

* 39% of the extreme rural poor are estimated to live in or around tropical forests and savannahs. Due to unclear tenure and rights, remoteness from markets, infrastructure, social protection and inclusive policies, low levels of representative organizations and services, poverty in forest areas is inadequately addressed. **Extra efforts are needed to reach forest dependent populations, especially in remote areas, in order to achieve SDG target 1.1.**
* **Forests provide a substantial proportion of income for rural people**, on average 22% of the total income for forest dependent communities, which otherwise would risk falling deeper into or below the poverty line. The subsistence use of forest products represent the largest value for local people, between three and five times the cash contributions. Poorer households depend on a larger degree on these “free” resources.
* Trees and integral parts of agricultural landscapes, with 46% of agricultural land having at least 10% tree cover. **Trees provide important provisioning and regulating ecosystem services that help strengthen the resilience of rural livelihoods.**
* Existing data gaps limit our knowledge under what conditions forests contribute to development goals and help reduce poverty. **More research on forest and poverty linkages** that address land rights and disaggregated poverty data will help close these gaps.

**SDG 1 Sources**

Angelsen, A, Jagger, P, Babigumira, R, Belcher, B, Hogarth, N and Bauch, S*.* 2014. Environmental income and rural livelihoods: A global-comparative global-comparative analysis. *World Development.*

Agrawal, A, Cashore, B, Hardin, R, Shepherd, G, Benson, C and Miller, D. 2013. *Economic Contributions of Forests.* Background paper prepared for the United Nations Forum on Forests.

Cavendish, W. 1999. *Poverty, Inequality and Environmental Resources: Quantitative Analysis of Rural Households.* Center for the Study of African Economies working paper series 99-9.

Cavendish, W. 2003. *How Do Forests Support, Insure and Improve The Livelihoods Of The Rural Poor? A Research Note.* [Center for International Forestry Research](http://www.cifor.org/), Bogor, Indonesia.

Chomitz, K.M. 2007. *At loggerheads: agricultural expansion, poverty reduction, and environment in the tropical forests.* World Bank, Washington DC, USA.

De Leeuw J, Njenga M, Wagner B and Iiyama M. (Eds.) 2014. *Treesilience:* *An assessment of the resilience provided by trees in the drylands of Eastern Africa.* The World Agroforestry Centre, Nairobi, Kenya.

Ding, H, Veit, P. G, Blackman, A, Gray, E, Reytar, K, Altamirano, J. C and Hodgdon, B. 2016. *Climate Benefits, Tenure Costs. The Economic Case For Securing Indigenous Land Rights in the Amazon.* World Resources Institute, Washington DC, USA.

FAO. 2014. *State of the World’s Forests: Enhancing the socioeconomic benefits from forests.* Food and Agriculture Organization of the United Nations, Rome, Italy.

FAO. 2015. *Global Forest Resources Assessment 2015. How are the world’s forests changing?.* Food and Agriculture Organization of the United Nations, Rome, Italy.

Fisher, M, Chaudhury M and McCusker, B. 2010. Do Forests Help Rural Households Adapt to Climate Variability? Evidence from Southern Malawi. *World Development* 38(9): 1241–1250.

Gilmour, D. 2016. *Forty years of community-based forestry. A review of its extent and effectiveness.* FAO Forestry Paper 176.Food and Agriculture Organization of the United Nations, Rome, Italy.

Hobley, Mary, Multi-stakeholder forestry programme, 2017 Persistence and Change: 30 Years of Community Forestry in Nepal. http://www.msfp.org.np/uploads/publications/file/ebook\_interactiv\_20130517095926.pdf

IFAD. 2013. *Smallholders, food security, and the environment.* International Fund for Agricultural Development, Rome, Italy.

IFAD. 2016. *Rural Development Report 2016. Fostering inclusive rural transformation.* International Fund for Agricultural Development, Rome, Italy.

Miller, D, Muñoz-Mora, J.C and Christiaensen, L. 2016. *Prevalence, Economic Contribution, and Determinants of Trees on Farms across Sub-Saharan Africa.* Policy Research Working Paper 7802. World Bank, Washington DC, USA.

Noack, F, Wunder, S, Angelsen, A and Börner, J. 2015. *Responses to Weather and Climate. A Cross-Section Analysis of Rural Incomes.* Policy Research Working Paper 7478. World Bank, Washington DC, USA.

RRI. 2014. *What Future for Reform? Progress and slowdown in forest tenure reform since 2002.* Rights and Resources Initiative, Washington DC, USA.

Shepherd, G. 2012. *Rethinking Forest Reliance: Findings about poverty, livelihood resilience and forests from IUCN’s ‘Livelihoods and Landscapes’ strategy.* International Union for the Conservation of Nature, Gland, Switzerland.

Shepherd, G, Kazoora, C and Mueller, D. 2013. *Forests, livelihoods and poverty alleviation: the case of Uganda.* Food and Agriculture Organization of the United Nations, Rome, Italy.

Stevens, C, Winterbottom, R, Springer, J and Reytar, K. 2014. *Securing Rights, Combating Climate Change. How Strengthening Community Forest Rights Mitigates Climate Change.* World Resources Institute, Washington DC, USA.

Sunderlin, W.D, Dewi, S and Puntodewo, A. 2007. *Poverty and Forests: multi-country analysis of spatial association and proposed policy solutions.* CIFOR Occasional paper no 47. Center for International Forestry Research, Bogor, Indonesia.

Vedeld, P, Angelsen, A, Bojo, J, Sjaastad, E, and Berg, G. 2007. Forest environmental incomes and the rural poor. *Forest Policy and Economics* 9(7): 869‐879.

Wunder S, Börner J, Shively G and Wyman, M. 2014. Safety Nets, Gap Filling and Forests: A Global- Comparative Perspective. *World Development* 64: 29-42.

Zomer, R.J, Trabucco, A, Coe, R and Place, F. 2009. *Trees on Farm: Analysis of Global Extent and Geographical Patterns of Agroforestry.* ICRAF Working Paper no. 89. World Agroforestry Centre, Nairobi, Kenya.

1. Ecosystem services are the benefits people obtain from ecosystems. These include provisioning services such as food and water; regulating services such as flood and disease control; cultural services such as spiritual, recreational, and cultural benefits; and supporting services, such as nutrient cycling, that maintain the conditions for life on Earth. (Millenium Ecosystem Assessment, <https://millenniumassessment.org/documents/document.300.aspx.pdf> ) [↑](#footnote-ref-1)
2. The term environmental income is used to reflect the “the hidden harvest”—the diversity of goods provided freely from the environment, i.e., from non-cultivated ecosystems such as natural forests, woodlands, wetlands, lakes, rivers, and grasslands. (World Developmentm Volume 64, Supplement 1, December 2014, Pages S12-S28

   World Development, Arild Angelsen et al Environmental Income and Rural Livelihoods: A Global-Comparative Analysis, http://www.sciencedirect.com/science/article/pii/S0305750X14000722 [↑](#footnote-ref-2)