Using InVEST to Develop Poverty Reduction Strategies

InVEST (Integrated Valuation of Ecosystem Services and Tradeoffs) is a freely-available software tool developed by the Natural Capital Project – a partnership of Stanford University, The Nature Conservancy (TNC) and World Wildlife Fund (WWF) – and used in more than ten places around the world. InVEST can be a useful tool for mainstreaming environmental considerations into Poverty Reduction Strategy Papers (PRSPs). This document provides guidance on how the current Tier 1 of InVEST can be used at each typical step of a PRSP.

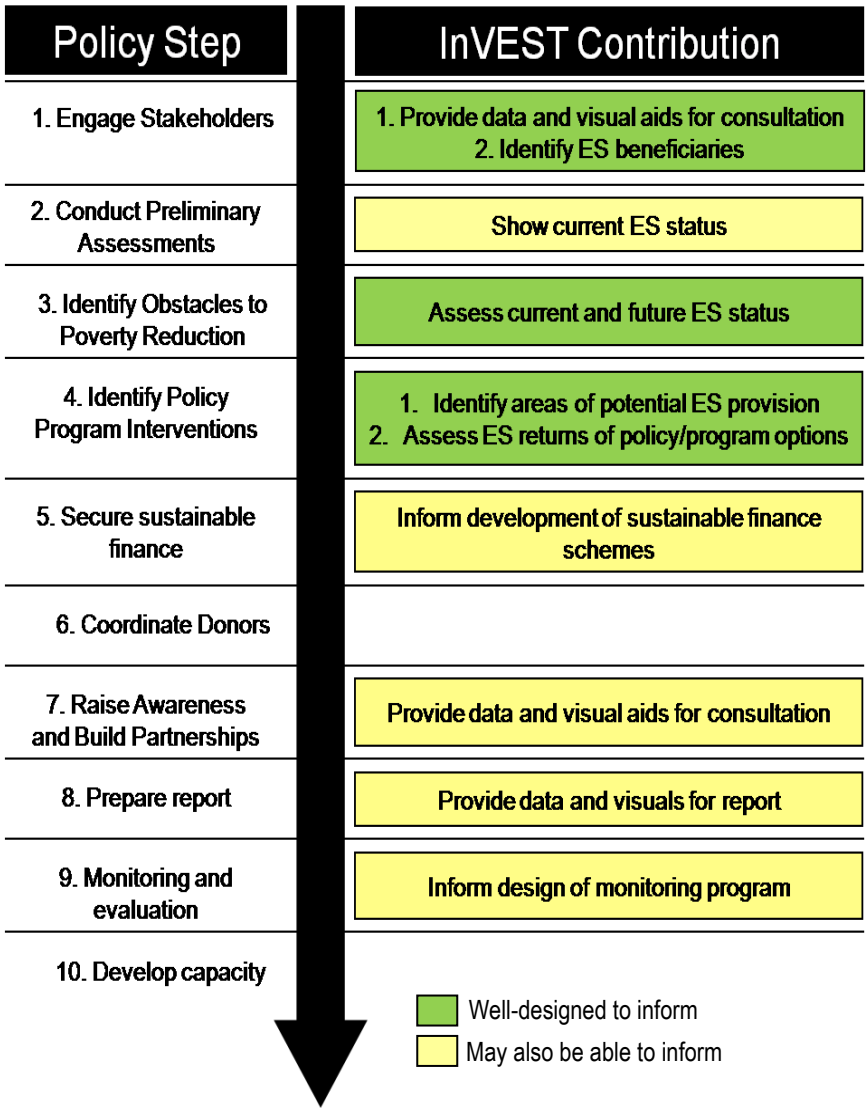
A PRSP is a strategy document describing a country's macroeconomic, structural, and social policies, and programs to promote economic growth and reduce poverty. A PRSP shapes some of the most influential national public policies, affecting budgetary priorities and sectoral plans. Since 1999, developing country governments prepare PRSPs as part of the process of applying for World Bank and International Monetary Fund (IMF) loans. The PRSP framework was designed to enhance the effectiveness of actions by countries and donors in reducing poverty. Integrating ecosystem services into PRSPs provides a powerful route to mainstream poverty-environment linkages into national and sectoral policies, plans and programs.

InVEST and PRSPs

Environmental degradation can exacerbate poverty in many important ways: increasing vulnerability to natural hazards, reducing access to fuel and food, and creating health risks. The World Bank itself notes the need to incorporate the environment into PRSPs. Nevertheless, environmental issues are still rarely considered in depth. InVEST can help support the integration of environmental considerations into PRSPs by identifying how ecosystem services benefit the poor and guiding selection of policies that sustain these benefits.

The PRSP framework is used selectively by countries and shaped by local priorities. Given this, the contributions InVEST can make to PRSPs will vary. Nevertheless, InVEST is better suited to certain steps of PRSP development than others. Here, we provide initial guidance on how InVEST can be used at each typical step (Fig 1). The aim is to give new InVEST users realistic expectations about when InVEST is – and is not – likely to be appropriate and helpful.

Figure 1. InVEST Contributions to Typical PRSP Steps



Further Details on InVEST Contributions to General PRSP Steps

Step 1: Stakeholder engagement

Stakeholder engagement occurs throughout the development of a PRSP, for transparent and inclusive decision making. It involves identifying relevant stakeholders and engaging them in a dialogue about policies for poverty reduction. InVEST may help by identifying where ecosystem services are supplied on the landscape. This information, combined with socio-economic and demographic data on local populations, can help identify stakeholders who may be affected by environmental degradation, and who should therefore participate in the PRSP. InVEST outputs, such as ecosystem service maps, can provide visual aids to communicate with stakeholders about how ecosystem services benefit them and the trade-offs that may result from different policies.

Step 2: Preliminary assessments

This step involves an initial review of issues relating to poverty reduction, using existing data, to determine what should be considered in the full PRSP. In most data-poor countries, an InVEST analysis is likely to be more time, resource and data intensive than is efficient for the preliminary assessments in a PRSP. However, if the input data required for InVEST are easily available, a low-resolution, simple analysis could be useful for gaining a first-cut understanding of the location and relative supply of ecosystem services on the current landscape, which could highlight ecosystem service issues that need to be further explored.

Step 3: Identifying obstacles to poverty reduction

As the full analysis gets underway, the PRSP identifies constraints on poverty reduction. In the environment realm, this involves understanding how the poor depend on – and are affected by – ecosystem services. This is supplemented with a broader analysis of the macroeconomic, structural, social, and institutional obstacles to poverty reduction. InVEST is suitable for assessing the location, quantity, and value of ecosystem services on current and likely future landscapes. When combined with socio-economic, institutional (e.g. property rights), and demographic data, one can determine where ecosystem services may be supporting the wellbeing of the poor and where lack of those services may be increasing poverty. Currently, InVEST can map where services exist spatially and overlap this with information on where the poor are located. However, it does not include information on the institutions or infrastructure that link people to services. InVEST can provide a sense of where connections between ecosystem services and the poor may be strong, but additional data and methods are needed to make direct links.

Step 4: Identifying objectives, policy interventions, and program development

This step involves setting goals for poverty reduction, and developing policies and programs for achieving these objectives. In practice, it may be easier to use InVEST for plans and programs where impacts on land-use are more highly specified than for high-level macroeconomic and structural policies. However, so long as the policy can be meaningfully translated into likely impacts on land-use and land-cover, InVEST can be used to estimate the location and magnitude of ecosystem service impacts. InVEST can also identify areas of potential ecosystem service provision. This can inform the selection of those policies that sustain ecosystem services for the benefit of poor communities.

Step 5: Budgeting and financing for environmental management

This step involves identifying finance for funding implementation of the PRSP. In developing country contexts, this may include financial and technical support from foreign donors. InVEST can inform the development of sustainable finance schemes where beneficiaries of ecosystem services pay suppliers that affect ecosystem service provision (see Issue No. 3 on payments for watershed services for more details). These schemes may – but not necessarily – support poverty reduction, if poor people are located in source areas for ecosystem services and can receive payments for provision.

Step 6: Donor coordination

Once funding needs are clarified, support from donors is coordinated to meet PRSP priorities.

Step 7: Awareness-raising and partnership building

This step involves building commitment to the PRSP, both within the country and among donors. InVEST

outputs, such as ecosystem service maps, provide visual aids for consultation and communication about how ecosystem services will be affected by the strategy.

Step 8: Prepare report

All the previous analyses are combined in a report documenting a PRSP strategy and action plan. InVEST does not itself generate reports. However, InVEST's outputs, with some additional analysis, can provide data and visuals for the report, such as ecosystem service maps and summary tables.

Step 9: Implementation, monitoring and evaluation

The PRSP is now implemented, with monitoring and evaluation to assess its success in achieving its goals. InVEST is not a real-time monitoring device; it models how ecosystem services are expected to alter under land-use arrangements, and is therefore not suitable at this step. It is not a substitute for field measures of actual delivery towards objectives. However, InVEST can be used to determine where to place monitoring stations, thereby improving the efficiency of the monitoring design.

Step 10: Institutional & capacity development

A final ongoing step involves building institutional and human capacity in the country to effectively implement the PRSP. InVEST is not suitable here.

Overarching Issues with Using InVEST for PRSPs

Policies vs. plans and programs: It may be easier to use InVEST to inform poverty reduction plans and programs than high-level policies. Plans and programs are usually specific, spatially defined and therefore tightly coupled to land-use and land-cover (an essential input for all InVEST models). Because policies are typically broad statements of intent, it may be hard to determine specific impacts on land-use to conduct an InVEST analysis.

Ecosystem services included: InVEST can model a number of ecosystem services that are closely related to the livelihoods of the poor, such as open-access harvest (includes non-timber forest products - NTFPs) and crop pollination. The open-access harvest module may be particularly relevant to PRSPs, helping to understand the benefits people gain from subsistence and market sales of NTFPs, and the importance of sustainable supply and access to these resources. Other InVEST modeled services may also affect poverty, such as carbon storage and sequestration, avoided reservoir sedimentation, hydropower production, water purification, and timber production. In the future, InVEST will also include models for water yield for crop irrigation, flood control and agricultural production. InVEST also has a simple biodiversity module, that estimates habitat integrity and rarity as a proxy for biodiversity.

Geographic scale: Many services in InVEST involve hydrologic processes that are best described at the sub-basin or larger scales. This may make InVEST inappropriate for exploring poverty reduction strategies at scales smaller than sub-basins. Given that PRSPs often cover national or regional scales, InVEST is generally appropriate.

Temporal scale: The current InVEST models only estimate ecosystem service provision on an annual average basis. When monthly or seasonal patterns in ecosystem service provision have important impacts on poverty, such as reduced water yield in dry seasons causing droughts, InVEST is not a useful assessment tool.

Relative vs. absolute values: Without calibration, InVEST is most useful for identifying the relative supply of ecosystem services across the landscape, to assess how these overlap with poverty and demographic indicators. If InVEST models are calibrated and there is good correlation between modeled results and observations, InVEST can estimate absolute values of services. However, this level of specificity may rarely be needed for a PRSP.

Biophysical vs. economic terms: InVEST can quantify ecosystem services in biophysical terms (e.g. tons of carbon). It can also estimate economic values using a range of techniques such as avoided damage or treatment costs and market valuation. Valuation can only be undertaken once the biophysical parts of the models are calibrated to time series data. Given the simplifications in the biophysical and economic models, economic value estimates should be treated as first estimates only, suitable for gaining support for PRSPs but may not be appropriate for detailed cost-benefit analyses.

Time and resources required: The skill and data requirements needed to apply InVEST are relatively limited. The scale, scope of services considered, and availability of data all affect the amount of time and capacity required. In general, it will take 1-3 people two months to a year to compile data and run the InVEST models. A full

application of InVEST results within the context of PRSPs will take longer. The team would need someone with basic GIS proficiency and may also require a hydrologist if water services are considered.

Further reading on InVEST and PRSPs

The Natural Capital Project: www.naturalcapitalproject.org
InVEST User's Guide: http://www.naturalcapitalproject.org/InVEST.html
InVEST download: http://invest.ecoinformatics.org

Bojö, J. & Reddy, R. C. (2002). Poverty reduction strategies and environment: A review of 40 interim and full poverty reduction strategy papers. *The World Bank Environmental Economics Series*. Paper No. 86.

IMF. (1999). *Poverty reduction strategy papers – operational issues*. Retrieved from: http://www.imf.org/external/np/prsp/prsp.asp.

UNDP-UNEP Poverty-Environment Initiative. (2009). *Mainstreaming poverty-environment linkages into development planning: A handbook for practitioners*. UNDP-UNEP Poverty-Environment Facility.

UNDP-UNEP Poverty-Environment Initiative. (2009). *A primer on the economic arguments for mainstreaming poverty-environment linkages into national development planning*. UNDP-UNEP Poverty-Environment Facility.

World Bank. (2009). *PRSP Sourcebook*.

InVEST in Practice is a series of short introductory materials to show potential InVEST users how the current Tier 1 of the InVEST tool can be applied to existing policy and planning processes. The guidance here is based on The Natural Capital Project's experiences developing and applying InVEST in more than ten places around the world. Each issue indicates how and when InVEST is likely to be helpful for each stage of a specific policy or planning context, and when it may be inappropriate. Our goal is to give users realistic expectations about the tool, based on the current understanding of its strengths and weaknesses. As more is learned about the tool through further testing, this guidance will be refined and updated. Every context is different. Experience thus far has shown that the applicability of InVEST to different decision contexts depends on the quality and availability of data and other ecosystem service tools, local modeling capacity, local institutional and governance structures and the policy time-frame. The guidance provided here should therefore be considered in light of the local context where InVEST may be applied. Additional tools and approaches will always be needed to complement InVEST when developing a PRSP.

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