SUMMARY OF PUBLIC CONSULTATION

VMD0054 Module for Estimating Leakage from ARR Activities, v1.0

A draft of *Module for Estimating Leakage from ARR Activities, v1.0*, was open for public consultation between 17 December 2021 to 28 January 2022. This document includes a list of each comment received and the developer's response.

GENERAL FEEDBACK

Section 5 - Procedures

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#	Organization	Comment	Developer's Response
1	Kennemer	(Pg. 5) Section 5.1.1 lacks a definition of the unit of "productivity". In t product / ha ? In USD revenue / ha ? A new system might produce <ton of product, but higher income / ha.	Yes, project proponents may use the CDM method. Based on Section 9.4 of the VCS Methodology Approval Process, once the new VCS leakage tool is ready, the CDM tool may be used for a grace period established by Verra (up to 12 months). Beyond the end of the grace period, projects must only use the new VCS leakage tool.
2	Conservation International	(Pg. 6) What is the reasoning for using a national average (rather than a sub-national regional average)? Using a national average rather than a regional average may not make much sense in countries with highly heterogeneous ecosystems, climates, forest management practices, etc. Unless you have actors with the flexibility to displace their activities at a national scale (e.g., medium-to-	The leakage tool will be revised. The new approach will be based on the amount of production that is displaced in the project area, and will not require any special guidance to incorporate new areas (project instances) that are added to a grouped project

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		large corporations or individuals with access to sufficient capital for such activities), it may not make sense to compare local productivity to national productivity. Where resources are scarce and mobility/flexibility is limited, those whose activities are displaced from the project area may be more likely to move to the closest highest productivity land available in the immediate surroundings of the project area. Using a national average relies on the assumption that activities displaced from the project area could move to any other part of the country, which may not be a valid assumption under conditions of heterogeneous land characteristics and limited access to capital as mentioned above. As far as market leakage, a national scale may make sense, but this will be context dependent and should be reviewed on a case-by-case basis; it will depend on the specific product as well as supply chains and actors and how well articulated a given region's production is with the national market. I think this will differ greatly between countries depending on their wealth and the state of their economies. Furthermore, what if the baseline activity is activities such as firewood extraction or charcoal production that are illegal and for which no national production data exists? Also, if for example the baseline activity is subsistence-driven, comparing it to a national average inflated with commercial production could artificially lower the risk of leakage.	

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3	Ecotierra	(Pg. 7) According to the table above, the most feasible scenario for almost any ARR project is Very high, as national carbon stocks include primary and secondary forest with high level of carbon stocks. Therefore, no project will take a carbon stock adjustment factor of 0.8. We consider that criteria and CSAF should be reviewed.	The tool will be revised to reference regional productivity data when available. Baselines for AR projects will not include instances where firewood, charcoals, or other timber products are displaced. Instances where subsistence activities are displaced by reforestation for carbon are fairly uncommon. When regional or national production data does not exist, historical production yields in the project area (prior to the start date) will be used in the calculation of new land that will be brought into production.
4	South Pole	(Pg. 7) Document states "Pre-project production data used for the project area must be verifiable and may be based on grower records or on remotely sensing data provided that remote sensing procedures have been peer reviewed and tested in a similar region and for the agricultural activity displaced by the project activity." What kind of remotely sensing data can be used? Can the tool give some examples?	The tool will be revised to reference regional stock data when available.
5	South Pole	(Pg. 7) Footnote states "Conservatively ignores lower carbon stocks in non-forested lands (e.g. shrublands) that may receive displaced activities." Does it mean that in the equation: RC = PC / NC, NC could be 0 (grasslands, shrublands), and then the CSAF value would be 1.50 -> Relative carbon stock in project area is less than 0.80	Revised tool will not use the CSAF, and will also incorporate regional stocks when available

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6	Ecotierra	(Pg. 8) VCS requires of calculating the Long-Term Average Carbon Stock for ARR Projects with Harvesting. This means ARR with harvesting shall include the loss of carbon due to harvesting in the quantification of project emissions. This process is associated to the time (project year) until the project should issue VCUs and this time is always shorter than the crediting period. Will it more accurate to have and adjustment factor associated to number of credits to be issued?	Revised tool will not use the CSAF and therefore LTA will not be required to estimate leakage
7	Conservation International	(Pg. 9) Again, what is the reasoning for using a national average (rather than a subnational regional average)? Using a national average rather than a regional average does not make much sense in countries with highly heterogeneous ecosystems, climates, forest management practices, etc. The same concerns presented regarding relative productivity also apply here.	This is correct. Based on Section 9.4 of the VCS Methodology Approval Process, the users will have a grace period to use the CDM methodologies when the ARR methodology and leakage tool is released. However, from that period the new ARR methodology and leakage tool will be the only option.
8	South Pole	(Pg. 9) Document states "The leakage discount factor is applied annually to the net emission reductions during the initial crediting period only and is calculated using Equation 4 below." What does it mean the initial crediting period? (the length of the crediting period? Or just the first years? How many years?)	Tool has been revised; yields are referenced and clearly defined as units of production per hectare. commodities produced per unit area in the project area prior to the project activity compared to national averages."

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9	South Pole	(Step 1) Document states "In the absence of national productivity data within the 5 years prior to the project start date or production data from the project area for any given year, a value of 1.0 for relative productivity may be assumed for that year." What is the reason to assume this value?	Leakage mitigation measures will be included in the revised tool.

Appendix 1 – Leakage Example

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10	South Pole	(Pg. 18) It should be 1,000 instead of 100	Leakage mitigation will be included in the revised tool, looking at increases in productivity in other areas as suggested, but will still reference regional or national productivity data to estimate the amount of new land that will need to be brought into production due to net displacement.
11	South Pole	(Pg. 19) It should be 150 instead of 50.0	Regional data on productivity and carbon stocks will be included in the revised tool.

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12	Biofilica	The development of the tool for leakage accounting by Verra is proposing to bring a more standardized and simplified approach to CDM methodology. Thus, it is understood that the tool will not only capture the displacement leakage from activities, but will also include market effects. We understand that the tool is still being refined, but, so far, it is plausible to attribute greater detail on how market effects may imply more or less leakage from the project. Furthermore, while the tool is not ready, should the project proponent apply the CDM method?	The guidance is intentionally broad and flexible to different RS approaches that exist now or emerge in the future, the only requirement is that "that remote sensing procedures have been peer-reviewed and tested in a similar region and for the agricultural activity displaced by the project activity."
13	Biofilica	The proposed methodology makes no reference to the guidelines applicable to grouped projects in the first instance. Even though there are no significant differences in the use of the methodology, we emphasize the fact that, at the very least, a guideline should be included on how to use it in grouped projects. Still, the new proposal does not contemplate how the leakage calculation will be performed in the scope of grouped projects, for example: should it be done for each project area and an average should be calculated? Furthermore, when new areas are included in the project, should the calculation be reviewed? We would like to emphasize the need to include a guideline to use the tool for leakage calculation in grouped projects.	The implication was that productivity observed in the project area is also what would be expected in the land receiving displacement, which seems like a reasonable assumption in the absence of national productivity data. The revised tool provides new guidance and requires, in the absence of regional or national yield data, that yields in the project area prior to the project start date are used to estimate new land that will be brought into production.

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14	Kennemer	5. Leakage Module: Please clarify if this module shall in the future be applicable to all VCS ARR products, incl. those using CDM A/R meths or only to projects using the new proposed ARR meth?	Will review and renumber tables in the revised tool.
15	Mombak	1. Leakage Adjustment to Account for Investments in Livestock Productivity: Reforestation projects that convert pasture land into secondary forests should be incentivized to directly manage the displacement of livestock by increasing agricultural productivity beyond the project boundary, and within the same region as the project. This action can reduce or even eliminate leakage entirely, depending on the scale of investment. There are a number of farms in Brazil operating considerably below their agronomic potential where increasing productivity is feasible via educating operators and providing support and guidance throughout the process2. The leakage formulas in the methodology should allow for the accounting of such actions and the proportional reduction in leakage associated with the project. In addition to mitigating leakage from a carbon project, such activities can stimulate the local economy and have positive knock-on effects by improving regional productivity beyond the farms targeted via direct investment3. If a project can document a direct investment in productivity enhancement (i.e.increasing the total production per unit area on land parcels in the same region as the project), we	RC will not be included in the revised tool, but will consider the areas that receive displaced production (e.g. by reference to land use change analysis) and associated carbon stock changes that would be expected.

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		suggest the Leakage Discount Factor should be reduced proportional to the investment made. The project operator must demonstrate that this productivity improvement would not otherwise have happened by providing historical data from the associated livestock producer(s) and showing that other recent investments were not made to improve productivity. In this case, the relative productivity term, RP, in the leakage formula could be used to represent the offset productivity from the project boundary: RP = P1 - PI2 where P1 represents the average productivity (cattle/ha/yr) within the project boundary before the project began, and PI2 is the average productivity increase from investment beyond the project boundary. For example, if prior to the project start date, the project boundary has P1 = 1 cow/ha, and through investments in the project, a nearby operation increases its productivity from 1 cow/ha to 1.7 cow/ha, meaning PI2 = 0.7, then RP = 0.3. So, rather than these factors comparing the average national productivity to the project boundary productivity, it would be used here to quantify the measured improvement in productivity from investments by the project. In circumstances where investments result in the offsetting of 100% of the displaced production (i.e., P1 = PI2), projects could achieve zero leakage. This approach will, of course, require monitoring to validate that the productivity increase has been made and is sustained. Mombak has explored the potential in Brazil to partner with local	

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		stakeholders (e.g. NGOs, farmers, and technical assistance firms) to increase the productivity of participating farms. We believe that supporting farm intensification to offset the potential displacement of agricultural production will enrich the local economy while reducing the demand for forest clearing. There are cases where investment in pasture intensification to increase productivity has reduced the demand for agricultural land in the Amazon. The figure below illustrates how the reforestation of areas with low productivity can be compensated with increased productivity (yield/hectare or animals/ha) outside the project area without deforestation. Examples of intensification in Amazon demonstrate increases in stocking rate from 25-50% in the first year5. We can assume an average stocking rate of 0.7UA/ha improving to 2UA then 5UA/ha, as it has been documented in the scientific literature6 and technical reports. 2 See: Strassburg et al, 2014; Feltran-Barbieri & Feres, 2021. 3 This could be considered a form of positive leakage arising from the spreading of knowledge on how to improve the productivity of livestock operations that improves regional productivity beyond the level required to offset the carbon project. 4 See Pecuária Verde Project in the Paragominas municipality, and the Novo Campo Program. Both on Amazon. 5 Examples from referencial projects in the Amazon: (1) socioeconomic indicators of the	

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		Project Pecuária Verde in the Paragominas municipality, (2) the Novo Campo Program in the state of Mato Grosso; (3) farms supported by The Nature Conservancy (TNC) in São Félix do Xingu municipality.	
16	Mombak	2. Regionally-focused leakage calculations We suggest that alternative calculations should be considered, perhaps as alternatives to the proposed leakage calculation method, when best data is available at a subnational scale to estimate leakage (similar to the approved Verra methodology VM0015). A regional approach assumes that supply chains occur in clusters - e.g. slaughterhouses will buy within a given range, such as a 300km radius, so the displacement of activities to supply beef will also happen within this buffer area. We are currently working with a number of academics on a regionally-focused approach leveraging a panel analysis and difference-in-differences method to obtain a more regional estimate of leakage. This type of land spillover has been estimated in recent research7, and it's a more robust method than the approach proposed in this methodology.	The tool will be revised so that leakage is no longer estimated as a rate and deducted over the project crediting period, and instead is measured in tons of CO2e and deducted from net GHG removals of the project starting in year 5 of the project, and in future years, if leakage emissions increase.
17	re.green S.A.	Our main concern is the elimination, in comparison with the previous CDM methodology ("CDM - AR-TOOL15"), of measures to mitigate the potential leakage. The scientific literature contains multiple examples of methods to mitigate leakage,	New examples provided in the revised tool.

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		and some of them were captured in the previous methodology. Arguably the most promising one is the development of projects that couple ecosystem restoration with the intensification of productivity that partially or completely offset the potential leakage effect. We termed this "Land Neutral Ecological restoration" (Cits 1-3). Such approach is also compatible with the so-called Landscape Approach to ecosystem restoration, championed by the UN Decade on Ecosystem Restoration. Our concern is that, by eliminating these leakage prevention options from the methodology, the associated incentives to develop and finance what are more complex and costly – yet more desirable from a sustainable development point of view - projects will vanish, and the whole sector will be dominated by more simplistic (and leakage-inducing) projects. As in most areas we simulated the additional "carbon stock adjustment factor" will be 1.5, projects will have a substantial penalty without options to mitigate them. In order to prevent this "race to the bottom", we kindly argue for the re-introduction of options to mitigate leakage, even if adapted (perhaps being a continuous formula relating the displaced production with intensified production, rather than a binary leakage/no-leakage consideration), and with a higher burden of proof on project developers.	
18	South Pole	The head Table 2 is repeated	New examples provided in the revised tool.

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19	TLLG	The module for estimating leakage from ARR activities provides procedures for determining an appropriate leakage discount factor (LDF), that avoids the need for leakage monitoring. The procedures for calculating LDF require inputs on project area productivity, that could be difficult to estimate for smallholder agroforestry projects. If data on productivity is not available, the highest standardised leakage discount factor of 20% must be applied. It is not clear if a standardised leakage discount rate of 20% is appropriate for all agroforestry contexts, and a less punitive default value may be more appropriate for some agroforestry activities that have a low risk of leakage. It is unclear how the module can be applied to generate a LDF for projects using census-based approaches that do not have defined project areas from which productivity data could be generated.	Will revise tool to assess commodity displacement and to incorporate productivity enhancements (on site or offsite) that reduce displacement.
20	Amazon	The leakage values in the EPA study: Reflect only domestic leakage within the US; they do not capture international leakage, which is what matters in the voluntary market context.	Will revise tool and no longer reference the EPA study.
21	Amazon	Reflect dynamics that are unique to the US land sector, which are quite different than in most of the developing world where most of these projects will be located. For example,	Will revise tool and no longer reference the EPA study.

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		in the EPA study's baseline, area in agricultural land is actually *declining* as productivity in our industrialized agricultural sector continues to increase. This is not what's happening globally, of course, where we're losing forest to grow more food. As another example, there's a lot of land sitting in CRP, not in cultivation, that is available for reforestation given a carbon price stimulus. That allows the model to reforest without displacing agriculture and without having a leakage effect. This is pretty unique to the US.	
22	Amazon	Reflect the application of a carbon price, which limits indirect land use change (leakage). Of course this is not how voluntary markets operate, and this is a lesson we're getting out of the Latta modeling.	Will revise tool and no longer reference the EPA study.
23	Amazon	Reflect net outcomes over decades-long balancing periods. The study tells us what the model thinks US leakage is on net over 20 years, 50 years, and 100 years. It doesn't tell us what it is in year 1, or year 2, or year 3…etc.. What this means is that, even if the model results are valid for the US, the application of those rates to every crediting year likely results is significant over crediting in the first years (and undercrediting in later years). In other words, we'd be borrowing from the climate over the next decade or so, which I think is indefensible. The TerraCarbon tool gives a lower leakage rate for projects with longer crediting periods,	Will revise tool and no longer reference the EPA study.

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		which misunderstands the EPA results—the actual leakage effect of a given project is the same in every project year regardless of its crediting period. All this does is create a weird incentive to claim (improperly accounted) credits for longer periods of time.	
24	Amazon	Are outdated. Of course, the EPA 2005 study is way out of date, based on a very early version of FASOM. This tool is therefore not exactly an example of scientific or thought leadership.	Will revise tool and no longer reference the EPA study.
25	Amazon	The issues above mean the leakage discount factors in the leakage tool likely significantly underestimate the leakage that will actually occur in practice when commodity production is displaced. At the same time, because the tool does not consider improvements to productivity in projects, it will significantly overpenalize projects that have these outcomes. Our project in Brazil for example would suffer an untenable leakage discount factor even though we will be able to demonstrate a zero leakage effect.	Will revise tool and no longer reference the EPA study to also incorporate leakage mitigation.
26	Amazon	I am concerned about the criticism you will receive when this is published. And we will ourselves need to draw distinctions between what we're planning to do and what this tool does. It's not a good look for anyone, and it will raise questions both externally as well as internally for me with my executives on why Amazon is throwing in with Verra in our agroforestry investments if Verra is so far off	Making revisions that should address the above concerns.

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		the mark on something as critical as this.	
27	Mombak	(Revised Leakage Tool) *Issued identified:* According to item 5.2.2. a proponent of multiple projects cannot benefit from an initial livestock intensification beyond what is necessary to offset leakage. That is, each new project would need a new pool of intensified farms. This generates inefficiencies, as there are gains in economic scale and time with the initial investment in a large number of farms to then allocate surplus productivity in various projects. *Our recommended change:* The protocol can allow an increase in productivity demonstrably beyond the need for a first project to be allocated to other future and geographically close projects if the projects share a common project developer. Thus, there is the optimization and incentive to invest in the intensification of agriculture with local benefits and risk reduction. To avoid double counting, all the areas must be geographically located (i.e. providing shapefiles) with verifiable reports of productivity and investments; e.g remote sensing data showing the vegetation indicators to pasture/crops in combination with reports of technical experts and local stakeholders such as the slaughterhouse about the volume of production.	Agree with general concept; but still need to consider how to operationalize; e.g., would leakagement management area require a stand-alone, registered report (alongside registered boundary) that would also allocate leakage mitigation results to specific projects, and that could change over time (e.g. productivity gains in first 5 years to Project A, productivity gains in next 5 years to project B that started after Project A?). And what if productivity declines in the future? how would that leakage be reallocated to multiple projects? It could be consider these and other relevant questions in a future update to the tool.
28	Mombak	(Revised Leakage Tool) *Issue identified:* The protocol is unclear on whether intensification	Agree that a sustained period of productivity gain should be sufficient to mitigate the impact of the project activity (or

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		will no longer be needed at some future point. This creates risks for project developers if long-term impacts of leakage discounts on credit generation are not well understood, particularly for projects that are 30 years or more. Also, the possibility of compensating assumes that the leakage is expected to be acute in the short term due to the low capacity of agents to invest in technology, but can we consider the long-term leakage impact to be zero/insignificant? We argue that it should be, so long as the project solves this with investments and after a few years leaves the farmer able to maintain a high level of productivity. *Our recommended change*: Consider a fade-out period of investment in intensification based on continued high productivity beyond the period of investment by the project developer. For instance, if the yield (kg/ha) or the cumulative rate of annual gains (%) remains above the regional average for a set period of time (perhaps beyond investments have been made to increase productivity), then the leakage mitigation is assumed to continue beyond the investment period.	said differently, productivity declines after a period of time would likely have also effected the baseline activity and are thus not an impact that should be attributed to the project activity). Suggest a period of 10 yrs for estimating leakage impacts (could then be available as leakage mitigation area for new projects).
29	Mombak	(Revised Leakage Tool) *Issue identified:* For instance, if a weather event (e.g. El Nino) impacts the productivity of the entire region, the farms under intensification will be impacted more strongly than other regional farms given the fragility of recent investments.	Leakage calculation is already cumulative (with any increase in cumulative leakage reported in any single year).

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		Our recommended change: Account for cumulative changes in productivity over time, rather than simply between reporting periods. Thus, if a large investment is made up front that results in a large jump in productivity, that benefit can be better distributed across the entire project timeline.	
30	Mombak	(Revised Leakage Tool) *Issue identified:* a project needs to be able to issue credits in the early stages, in some cases before intensification improvements can be measured. The timeframe for the intensification and sale of credits can be different for several reasons such as agronomic factors, financial performance, in due course this mismatch of costs and revenues can make projects with local co-benefits unfeasible. *Our recommended change:* A cumulative accounting approach would help solve this as well. Furthermore, if project proponents have not yet been able to measure the impact of their leakage investments at the time of the first monitoring report, the leakage could be assumed to be 0 (just in the first monitoring report) and then a cumulative accounting of leakage could be made in the second monitoring report, after the impacts of the leakage mitigation investments can be made. This would allow projects to access revenue from the sale of credits early and support the viability of the projects.	Leakage calculation is cumulative already; and delayed for up to five years already to allow leakage mitigation measures to be implemented and roughly aligned with period of time when market leakage impacts would be observed; further delayed recognition of leakage to support early carbon finance (not aligned with market leakage impacts) is not an objective of the quantification approach.

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31	Mombak	(Revised Leakage Tool) *Issue identified:* The example in the appendix 1 of the ARR leakage method indicates a stocking rate of 0.33 animal/hectare in the project area versus an average of 1.7 in our region of interest. Realistic numbers for stocking rate in degraded pasture (e.g. ~0.8UA/ha in Amazon) and average regional stocking rate would increase leakage estimate up to four times. This results in twice the estimated leakage calculated in the previously proposed module from Feb/2022. High leakage penalties may discourage carbon projects in general based on the size of this penalty. *Our recommendation change:* We suggest balancing this with an adjustment factor, such as the fraction of forest (f) that was included in the initial version of this ARR leakage module (also in the CDM protocol for reference). We believe that this factor more accurately represents the available forest areas in a region where leakage may occur and affects the choosing location of projects. In addition, areas with less vegetation and more restrictions on deforestation are more prone to agricultural intensification.	Leakage equations are based on the amount of displaced production; and will result in higher leakage values for areas with higher productivity. Fraction of forest should be discussed w/Verra; conservative to assume it is 100%, also b/c some grazing areas could be displaced to grasslands/cerrado which should not be excluded; if it is incorporated, then need to decide the area for this calculation (if not national, then regional definition becomes critical; also need to consider if/how to exclude protected areas that are effectively protected). Could also consider in future revisions.