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## ANNEX I: Questionnaire used for the survey of expert opinion

Background Information – Interviewee		Answer Choices	Comments (Optional)
<b>A</b>	Interviewee full name ..... Institutional affiliation (if any) .....		
<b>B</b>	What are the sources of information upon which your opinion is based?  <i>Select all that apply.</i>	<input type="checkbox"/> Primary research <input type="checkbox"/> Grey literature <input type="checkbox"/> Published literature <input type="checkbox"/> Experience of project implementation <input type="checkbox"/> Policy level research/implementation <input type="checkbox"/> Direct involvement in wildlife trade <input type="checkbox"/> Anecdotal information (e.g. opinions of others) Other:	
<b>C</b>	What is the scale at which you are commenting on for this product survey? (Please be as specific as you can)	<input type="checkbox"/> Country (Name:        ) <input type="checkbox"/> Province (Name:        ) <input type="checkbox"/> District (Name:        ) <input type="checkbox"/> Village (Name:        )	
<b>D</b>	What is the scale at which you are commenting on the trade network?	<input type="checkbox"/> International <input type="checkbox"/> National <input type="checkbox"/> Local	
<b>E</b>	What describes your role working with this product?  <i>Select all that apply.</i>	<input type="checkbox"/> Conservation <input type="checkbox"/> Development <input type="checkbox"/> Research <input type="checkbox"/> Private sector <input type="checkbox"/> Intermediary trader <input type="checkbox"/> Wholesaler	<input type="checkbox"/> Independent consultant <input type="checkbox"/> Retailer <input type="checkbox"/> Regulatory enforcement <input type="checkbox"/> Other:
<b>F</b>	Which part of the trade chain are you most familiar with?	<input type="checkbox"/> Harvesting/production <input type="checkbox"/> Intermediate trade (including import/export) <input type="checkbox"/> End consumption <input type="checkbox"/> All parts equally	
Background Information – Product & Product Characteristics		Answer Choices	Comments (Optional)
<b>G</b>	Product name .....		
<b>H</b>	What species is it derived from? .....		
<b>I</b>	What is the source of the product? - If it is an animal:  - If it is a plant:  - If it is a fungus:	<input type="checkbox"/> Whole or part of carcass (where harvesting kills the animal) <input type="checkbox"/> Product made by the animal, such as honey, silk or birds nest (where harvesting does not kill the animal) <input type="checkbox"/> Vegetative structure (such as leaves, branches, bark, roots) <input type="checkbox"/> Reproductive structure (such as flowers, fruits, seeds) <input type="checkbox"/> Plant product (exudate such as latex, resin, gum) <input type="checkbox"/> Product of parasitic infection of plant (e.g. stick lac, agarwood)	

What's Driving the Wildlife Trade?

Background Information – Product & Product Characteristics		Answer Choices	Comments (Optional)	
		<input type="checkbox"/> Whole fungus (e.g. edible mushrooms) <input type="checkbox"/> Product created by the fungus		
<b>J</b>	How perishable is the product?	<input type="checkbox"/> Not perishable <input type="checkbox"/> Low (no processing or special storage facilities required for transport) <input type="checkbox"/> Moderate (processing or special storage facilities required for transport) <input type="checkbox"/> High (processing or special storage facilities required, but product still has short shelf-life) <input type="checkbox"/>		
<b>K</b>	What is the spatial extent of the production area from which the raw material can be harvested, as compared to the region over which the product is traded?	<input type="checkbox"/> Small – approximate harvest area is less than 10% of trade region <input type="checkbox"/> Medium – product can be harvested over 1/3 of the trade region <input type="checkbox"/> Large – product can be harvested over more than 1/3 of trade region		
<b>J</b>	What is the scale of trade in this product?	<input type="checkbox"/> Local <input type="checkbox"/> National <input type="checkbox"/> International		
<b>L</b>	What has been the growth trend in human population in the production area (over the past 10 years)?	<input type="checkbox"/> Human population increasing <input type="checkbox"/> Human population relatively stable <input type="checkbox"/> Human population decreasing		
Questions – Harvesting, Trade and Consumption		Answer Choices	Confidence	Comments
<b>1</b>	Is this product mostly harvested for trade or for subsistence use?	<input type="checkbox"/> Majority harvested for subsistence (within household) <input type="checkbox"/> Majority harvested for trade (outside of household) <input type="checkbox"/> Both equally important <input type="checkbox"/> Unknown or impossible to specify		
<b>2</b>	What is the importance of trade in this product to overall household income?	<input type="checkbox"/> Contributes more than 50% of household income <input type="checkbox"/> Contributes 10-50% of household income <input type="checkbox"/> Contributes less than 10% of household income <input type="checkbox"/> Varies from household to household		
<b>3a</b>	Are most wildlife harvesters:	<input type="checkbox"/> Operating independently <input type="checkbox"/> Working for others as hired labour <input type="checkbox"/> Working on an informal “contract” basis for suppliers/middlemen		
<b>3b</b>	Who harvests the species?  <i>Select all that apply.</i>	<input type="checkbox"/> Local people working independently <input type="checkbox"/> Local people working for outsiders <input type="checkbox"/> Local people working for other local people <input type="checkbox"/> Outsiders working independently <input type="checkbox"/> Outsiders working for outsiders <input type="checkbox"/> Outsiders working for local people <input type="checkbox"/> Incoming settlers <input type="checkbox"/> Commercial/private enterprise <input type="checkbox"/> Government agency		
<b>4</b>	Is harvesting of this product <u>primarily</u> used to fill unforeseen/emergency income gaps (e.g. due to sudden cash needs, collapse of other income sources)?	<input type="checkbox"/> Yes <input type="checkbox"/> No		
<b>5a</b>	Is harvest of the product carried out:	<input type="checkbox"/> Seasonally <input type="checkbox"/> All year round		

What's Driving the Wildlife Trade?

Questions – Harvesting, Trade and Consumption	Answer Choices	Confidence	Comments
<b>5b</b> Is supply of the product available for harvesting:	<input type="checkbox"/> Seasonal <input type="checkbox"/> All year round		
<b>6</b> Does the importance of trade in the product to livelihoods vary at different times of the year?	<input type="checkbox"/> Yes <input type="checkbox"/> No		
<b>7</b> Which income level is primarily responsible for harvesting the product? <i>Select one answer.</i>	<input type="checkbox"/> Poorest 1/3 of households <input type="checkbox"/> Middle 1/3 of households <input type="checkbox"/> Wealthiest 1/3 of households <input type="checkbox"/> Variety of income groups		
<b>8</b> What genders/ages are primarily responsible for harvesting the product? <i>Select all answers that apply.</i>	<input type="checkbox"/> Children <input type="checkbox"/> Adult men <input type="checkbox"/> Adult women		
<b>9</b> How are harvesters paid? <i>Select all answers that apply.</i>	<input type="checkbox"/> Cash advance, to harvest certain products <input type="checkbox"/> Cash on sale <input type="checkbox"/> Barter exchange <input type="checkbox"/> Paid as formal/informal employees for time worked, rather than amount of product harvested		
<b>10</b> How has the price paid (per unit of product) to harvesters changed <b>in real terms</b> during the last 10 years?	<input type="checkbox"/> Increased <input type="checkbox"/> Decreased <input type="checkbox"/> Stayed the same <input type="checkbox"/> No clear trend		
<b>11a</b> Have there been any external interventions aimed at reducing poverty among households harvesting this product or in areas where there are high levels of trade in this product?	<input type="checkbox"/> Yes <input type="checkbox"/> No		
<b>11b</b> If yes (to 11a), how successful have these interventions been in terms of alleviating poverty?	<input type="checkbox"/> Very successful <input type="checkbox"/> Somewhat successful <input type="checkbox"/> Unsuccessful		
<b>11c</b> If 'very successful' or 'somewhat successful' (in 11b), is there evidence that people have moved away from harvesting wildlife for trade?	<input type="checkbox"/> Yes, people have moved away from harvesting wildlife for trade. <input type="checkbox"/> No, people have not moved away from harvesting wildlife for trade.		
<b>12a</b> Do you believe that people shift away from wildlife harvest/trade and into other livelihood/income sources as their socio-economic status improves?	<input type="checkbox"/> Yes <input type="checkbox"/> No		
<b>12b</b> If yes, what other livelihood or income sources are they moving into?	<i>Please list briefly:</i>		
<b>13</b> Do you believe that people move into wildlife harvest for trade as their socio-economic status declines?	<input type="checkbox"/> Yes <input type="checkbox"/> No		
<b>14</b> Are there other income generating opportunities that are available to harvester households (other than harvesting of the product)?	<input type="checkbox"/> Yes, there are many <input type="checkbox"/> Yes, there are a few <input type="checkbox"/> No, there are none		
<b>15</b> How important is the wildlife trade (in this product and other products) as a livelihood activity to harvesters, in comparison to other livelihood options available?	<input type="checkbox"/> The most important – almost no other activities <input type="checkbox"/> Very important – one of only a few activities <input type="checkbox"/> Somewhat important – one of many activities <input type="checkbox"/> Relatively unimportant – an occasional activity		
<b>16</b> What percentage of annual harvester household income is generated from	<input type="checkbox"/> Less than 1/4 <sup>th</sup> of total income		

What's Driving the Wildlife Trade?

Questions – Harvesting, Trade and Consumption	Answer Choices	Confidence	Comments
the trade of wildlife products <u>other</u> than the one considered in this questionnaire?	<input type="checkbox"/> Approximately ¼ to ½ of total income <input type="checkbox"/> Approximately ½ to ¾ of total income <input type="checkbox"/> More than ¾ of total income		
<b>17</b> In general is harvesting of the product opportunistic or a planned activity?	<input type="checkbox"/> Opportunistic <input type="checkbox"/> Planned		
<b>18a</b> Have there been any external interventions to create alternative livelihood options for harvesters?	<input type="checkbox"/> Yes <input type="checkbox"/> No		
<b>18b</b> If yes (to 18a), is there evidence that these have resulted in a reduction in harvesting of wildlife <u>in general</u> ?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unsure		
<b>18c</b> If yes (to 18 a), is there evidence that these have resulted in a reduction in harvesting <u>specifically of this product</u> ?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unsure		
<b>19a</b> Is the product harvested from non-wild sources (e.g. cultivated or farmed)?	<input type="checkbox"/> Yes, harvested from wild and non-wild sources <input type="checkbox"/> No, only harvested from wild sources		
<b>19b</b> If yes (to 19a), estimate the percentage of volume produced for trade from <u>non-wild</u> sources.	<input type="checkbox"/> 0-25% <input type="checkbox"/> 26-50% <input type="checkbox"/> 51-75% <input type="checkbox"/> 76-100%		
<b>19c</b> Are the same people involved in non-wild and wild harvest?	<input type="checkbox"/> In most cases <input type="checkbox"/> Sometimes <input type="checkbox"/> Never		
<b>19d</b> If yes (to 19a), is there a trend towards increased harvesting from non-wild sources? Was this product previously wild harvested?	<input type="checkbox"/> Yes <input type="checkbox"/> No		
<b>20</b> What is the main reason for harvesting this product?	<input type="checkbox"/> Income <input type="checkbox"/> Pest removal <input type="checkbox"/> Enjoyment <input type="checkbox"/> By-catch <input type="checkbox"/> Culture/tradition <input type="checkbox"/> Other:		
<b>21</b> What is the primary motivation for harvesting wildlife (in general)?	<input type="checkbox"/> For own use, with the surplus sold <input type="checkbox"/> For trade, with the surplus consumed at home <input type="checkbox"/> Both/varies		
<b>22</b> Is the product traded a by-product of another livelihood activity?	<input type="checkbox"/> Yes: <input type="checkbox"/> No		
<b>23a</b> Is there any evidence that harvesters have left the trade over the past 10 years?	<input type="checkbox"/> Yes <input type="checkbox"/> No		
<b>23b</b> If yes, why?	<input type="checkbox"/> Ill health <input type="checkbox"/> Regulation <input type="checkbox"/> Age <input type="checkbox"/> Decline in demand <input type="checkbox"/> Regulation <input type="checkbox"/> Collapse of markets <input type="checkbox"/> Immigrants <input type="checkbox"/> Lack of harvestable resource <input type="checkbox"/> Substitution with another product <input type="checkbox"/> Decline in profitability <input type="checkbox"/> Other:		
<b>24</b> If consumer income increases, what do you believe would happen to the amount of product consumed?	<input type="checkbox"/> Increases <input type="checkbox"/> Decreases <input type="checkbox"/> Stays the same		

What's Driving the Wildlife Trade?

Questions – Harvesting, Trade and Consumption	Answer Choices	Confidence	Comments
<b>25</b> If product prices increase, what do you believe would happen to the level of demand for the product?	<input type="checkbox"/> Increases <input type="checkbox"/> Decreases <input type="checkbox"/> Stays the same		
<b>26</b> For end-consumers, is the wildlife product considered a:	<input type="checkbox"/> Luxury good <input type="checkbox"/> Essential item <input type="checkbox"/> Other:		
<b>27a</b> If supply increases (i.e. the amount of product being harvested), what do you believe would be the effect on price paid by consumers?	<input type="checkbox"/> Increases <input type="checkbox"/> No discernible relationship <input type="checkbox"/> Decreases		
<b>27b</b> If supply decreases, what do you believe would be the effect on price paid by consumers?	<input type="checkbox"/> Increases <input type="checkbox"/> No discernible relationship <input type="checkbox"/> Decreases		
<b>28</b> What have the trends been over the last 10 years? - Demand for the product in national markets has - Price of the product in national markets has  - Demand for the product in international markets has - Price of the product in international markets has	<input type="checkbox"/> Increased <i>or</i> <input type="checkbox"/> Decreased <i>or</i> <input type="checkbox"/> No clear trend <input type="checkbox"/> Increased <i>or</i> <input type="checkbox"/> Decreased <i>or</i> <input type="checkbox"/> No clear trend  <input type="checkbox"/> Increased <i>or</i> <input type="checkbox"/> Decreased <i>or</i> <input type="checkbox"/> No clear trend <input type="checkbox"/> Increased <i>or</i> <input type="checkbox"/> Decreased <i>or</i> <input type="checkbox"/> No clear trend		
<b>29</b> Is the product easily substitutable (i.e. will consumers readily purchase an alternative)?	<input type="checkbox"/> Yes, with the same product obtained from non-wild sources <input type="checkbox"/> Yes, with similar products obtained from other species <input type="checkbox"/> Yes, with synthetics <input type="checkbox"/> No		
<b>30</b> Do you believe that changes in the prices of substitutes have a significant influence on market demand for the wildlife product?	<input type="checkbox"/> Yes <input type="checkbox"/> No, because substitutes are considered inferior <input type="checkbox"/> No, for other reasons		
<b>31a</b> For each of the following, what have been the trends over the past 10 years? <i>Please tick the appropriate box.</i> - The abundance of the species in the wild is - The availability/affordability of substitutes is - The quality/availability of transport infrastructure is - The volume of Domestic trade in the product is - The number of harvest controls (including protected areas) are - The number of International trade controls are - Awareness of controls among harvesters is - Awareness of controls among traders is - Enforcement of controls is	<input type="checkbox"/> increasing <i>or</i> <input type="checkbox"/> decreasing <i>or</i> <input type="checkbox"/> stable <input type="checkbox"/> increasing <i>or</i> <input type="checkbox"/> decreasing <i>or</i> <input type="checkbox"/> stable <input type="checkbox"/> increasing <i>or</i> <input type="checkbox"/> decreasing <i>or</i> <input type="checkbox"/> stable <input type="checkbox"/> increasing <i>or</i> <input type="checkbox"/> decreasing <i>or</i> <input type="checkbox"/> stable <input type="checkbox"/> increasing <i>or</i> <input type="checkbox"/> decreasing <i>or</i> <input type="checkbox"/> stable <input type="checkbox"/> increasing <i>or</i> <input type="checkbox"/> decreasing <i>or</i> <input type="checkbox"/> stable <input type="checkbox"/> increasing <i>or</i> <input type="checkbox"/> decreasing <i>or</i> <input type="checkbox"/> stable <input type="checkbox"/> increasing <i>or</i> <input type="checkbox"/> decreasing <i>or</i> <input type="checkbox"/> stable <input type="checkbox"/> increasing <i>or</i> <input type="checkbox"/> decreasing <i>or</i> <input type="checkbox"/> stable <input type="checkbox"/> increasing <i>or</i> <input type="checkbox"/> decreasing <i>or</i> <input type="checkbox"/> stable		
<b>31b</b> What is the most important factor that influences changes in product demand? (Select from the list in 37a, or identify an alternate factor.)	<i>Please state.</i>		
<b>32</b> If the price of the wildlife product increases, do you believe that supply would:	<input type="checkbox"/> Increase <input type="checkbox"/> Decrease <input type="checkbox"/> Stay the same		
<b>33</b> What is the relationship between supply and demand for the product?	<input type="checkbox"/> Supply exceeds demand <input type="checkbox"/> Demand exceeds supply <input type="checkbox"/> Supply and demand are matched		

What's Driving the Wildlife Trade?

Questions – Harvesting, Trade and Consumption	Answer Choices	Confidence	Comments
<b>34</b> Is demand for the wildlife product:	<input type="checkbox"/> Seasonal <input type="checkbox"/> Dependent on special needs (e.g. medicine, ritual) <input type="checkbox"/> Relatively constant throughout the year		
<b>35a</b> How does the product move from harvester to trader?	<input type="checkbox"/> Traders visit the community to purchase from harvesters <input type="checkbox"/> Harvesters bring the product to sell to traders <input type="checkbox"/> Harvesters sell directly to consumers (if so, skip question 43b)		
<b>35b</b> How often do harvesters and traders interact?	<input type="checkbox"/> Fixed/regular times <input type="checkbox"/> Variable/irregular times		
<b>36</b> Do traders rely solely on the trade of wildlife to make a living, or do they also trade other products?	<input type="checkbox"/> Specialise in trading only this product <input type="checkbox"/> Trade a few wildlife products <input type="checkbox"/> Trade any/many species		
<b>37</b> What have the trends been over the last 10 years? - Number of harvesters collecting the product has - Number of traders buying directly from harvesters has - Number of retail outlets where product is sold has - Volume of product consumed at national level has - Volume of product consumed at international level has - Total volume of trade has - Total value of trade has	<input type="checkbox"/> Increased <i>or</i> <input type="checkbox"/> Decreased <i>or</i> <input type="checkbox"/> No clear trend <input type="checkbox"/> Increased <i>or</i> <input type="checkbox"/> Decreased <i>or</i> <input type="checkbox"/> No clear trend <input type="checkbox"/> Increased <i>or</i> <input type="checkbox"/> Decreased <i>or</i> <input type="checkbox"/> No clear trend <input type="checkbox"/> Increased <i>or</i> <input type="checkbox"/> Decreased <i>or</i> <input type="checkbox"/> No clear trend <input type="checkbox"/> Increased <i>or</i> <input type="checkbox"/> Decreased <i>or</i> <input type="checkbox"/> No clear trend <input type="checkbox"/> Increased <i>or</i> <input type="checkbox"/> Decreased <i>or</i> <input type="checkbox"/> No clear trend <input type="checkbox"/> Increased <i>or</i> <input type="checkbox"/> Decreased <i>or</i> <input type="checkbox"/> No clear trend		
<b>38</b> Which of the following are true of the trade chain?  <i>Select all that apply.</i>	<input type="checkbox"/> Relatively well established <input type="checkbox"/> Relatively poorly established <input type="checkbox"/> Markets are typically in same location from year to year <input type="checkbox"/> People involved in harvesting and trade are typically the same from year to year <input type="checkbox"/> Difficult for harvesters to access traders <input type="checkbox"/> Involves temporary points of sale <input type="checkbox"/> Crosses one international border <input type="checkbox"/> Crosses multiple international borders		
<b>39</b> Does the price of the wildlife product vary between seasons?	<input type="checkbox"/> No <input type="checkbox"/> Yes, related to changes in demand <input type="checkbox"/> Yes, related to changes in supply		
<b>40</b> Which of the following have influenced the change in supply of this product? (Select all that apply.)	<input type="checkbox"/> Improved physical infrastructure (roads, etc) <input type="checkbox"/> New economic activities opening up areas (mining, logging etc) <input type="checkbox"/> Illegal logging facilitating wildlife trade <input type="checkbox"/> Improved communication and connectivity with market towns <input type="checkbox"/> Health scares and disease epidemics <input type="checkbox"/> Other:		
<b>41</b> Is the product harvested illegally from protected areas (PAs)?	<input type="checkbox"/> Always harvested from PAs <input type="checkbox"/> Frequently harvested from PAs <input type="checkbox"/> Sometimes harvested from PAs <input type="checkbox"/> Never harvested from PAs <input type="checkbox"/> Does not occur in PAs.		
<b>42</b> Are there National legal restrictions on harvest in place?	<input type="checkbox"/> Yes		

What's Driving the Wildlife Trade?

Questions – Harvesting, Trade and Consumption		Answer Choices	Confidence	Comments
		<input type="checkbox"/> No		
<b>43</b>	How have National legal harvest controls for the product changed in the past 10 years?	<input type="checkbox"/> Increased <input type="checkbox"/> Decreased <input type="checkbox"/> No change		
<b>44a</b>	Have these changes resulted in a reduction in volume harvested?	<input type="checkbox"/> No effect <input type="checkbox"/> Yes, with immediate effect <input type="checkbox"/> Yes, with effects felt in about 2 years <input type="checkbox"/> Yes, with effects felt in about 5 years <input type="checkbox"/> Yes, with effects felt in about 10 years		
<b>44b</b>	Have these changes resulted in any changes in the amount of corruption related to the wildlife trade (e.g. bribing officials)	<input type="checkbox"/> Yes <input type="checkbox"/> No		
<b>45a</b>	Are there harvest quotas in place?	<input type="checkbox"/> Yes <input type="checkbox"/> No		
<b>45b</b>	If yes, to what extent have these quotas been implemented? <i>Why? Please explain briefly..</i>	<input type="checkbox"/> Fully or <input type="checkbox"/> Mostly or <input type="checkbox"/> Sometimes or <input type="checkbox"/> Never		
<b>45c</b>	If yes (to 45a), how do actual harvest volumes compare to annual quotas?	<input type="checkbox"/> Actual volumes are about the same as quotas <input type="checkbox"/> Actual volumes are lower than quotas <input type="checkbox"/> Actual volumes are higher than quotas		
<b>45d</b>	If yes (to 45a), how effective have these quotas been in regulating trade? <i>Why? Please explain briefly.</i>	<input type="checkbox"/> Very or <input type="checkbox"/> Somewhat or <input type="checkbox"/> Slightly or <input type="checkbox"/> Not effective		
<b>46a</b>	Are licenses/permits required for legal harvest?	<input type="checkbox"/> Yes <input type="checkbox"/> No		
<b>46b</b>	If yes (to 46a), what proportion of the harvest is covered by legal permits?	<input type="checkbox"/> All <input type="checkbox"/> More than half <input type="checkbox"/> Less than half <input type="checkbox"/> None		
<b>45d</b>	If yes (to 46a), how effective have these quotas been in regulating trade? <i>Why? Please explain briefly.</i>	<input type="checkbox"/> Very or <input type="checkbox"/> Somewhat or <input type="checkbox"/> Slightly or <input type="checkbox"/> Not effective		
<b>47a</b>	Are there International legal restrictions on trade in place?	<input type="checkbox"/> Yes <input type="checkbox"/> No		
<b>47b</b>	If yes, mark all that apply.	<input type="checkbox"/> CITES <input type="checkbox"/> Bilateral trade agreements <input type="checkbox"/> Regional trade agreements		
<b>47c</b>	How effective have these been in regulating wildlife trade? - Effectiveness of CITES o <i>Why? Please explain briefly.</i> - Effectiveness of Bilateral trade agreements o <i>Why? Please explain briefly.</i> - Effectiveness of Regional trade agreements o <i>Why? Please explain briefly.</i>	<input type="checkbox"/> Very or <input type="checkbox"/> Somewhat or <input type="checkbox"/> Slightly or <input type="checkbox"/> Not effective - - <input type="checkbox"/> Very or <input type="checkbox"/> Somewhat or <input type="checkbox"/> Slightly or <input type="checkbox"/> Not effective - - <input type="checkbox"/> Very or <input type="checkbox"/> Somewhat or <input type="checkbox"/> Slightly or <input type="checkbox"/> Not effective - -		

What's Driving the Wildlife Trade?

Questions – Harvesting, Trade and Consumption	Answer Choices	Confidence	Comments
<b>48</b> Level of awareness of regulations related to harvest and/or trade: - How aware are harvesters of national regulations? - How aware are traders of national regulations? - How aware are traders of international regulations?	<input type="checkbox"/> Very or <input type="checkbox"/> Mostly or <input type="checkbox"/> Slightly or <input type="checkbox"/> Not aware <input type="checkbox"/> Very or <input type="checkbox"/> Mostly or <input type="checkbox"/> Slightly or <input type="checkbox"/> Not aware <input type="checkbox"/> Very or <input type="checkbox"/> Mostly or <input type="checkbox"/> Slightly or <input type="checkbox"/> Not aware		
<b>49a</b> How have regulations impacted the livelihoods of <u>harvesters</u> ?	<input type="checkbox"/> Positive impacts on harvesters' livelihoods <input type="checkbox"/> Negative impacts on harvesters' livelihoods <input type="checkbox"/> Varied impacts on harvesters' livelihoods <input type="checkbox"/> No impact on harvesters' livelihoods		
<b>49b</b> How have regulations impacted the livelihoods of <u>traders</u> ?	<input type="checkbox"/> Positive impacts on traders' livelihoods <input type="checkbox"/> Negative impacts on traders' livelihoods <input type="checkbox"/> Varied impacts on traders' livelihoods <input type="checkbox"/> No impact on traders' livelihoods		
<b>50a</b> Where along the trade have efforts to enforce national and international regulations been <u>most</u> effective?  <i>Select all that apply.</i>	<input type="checkbox"/> Site of harvest <input type="checkbox"/> Point of first sale <input type="checkbox"/> Regional market <input type="checkbox"/> National market	<input type="checkbox"/> Point of export <input type="checkbox"/> Point of import <input type="checkbox"/> International market place <input type="checkbox"/> Other:	
<b>50b</b> Where along the trade have efforts to enforce national and international regulations been <u>least</u> effective?  <i>Select all that apply.</i>	<input type="checkbox"/> Site of harvest <input type="checkbox"/> Point of first sale <input type="checkbox"/> Regional market <input type="checkbox"/> National market	<input type="checkbox"/> Point of export <input type="checkbox"/> Point of import <input type="checkbox"/> International market place <input type="checkbox"/> Other:	
<b>51a</b> Have any of the following been effective in controlling trade in the product? <i>Select all that apply.</i>	<input type="checkbox"/> Risk of detection <input type="checkbox"/> Prosecution	<input type="checkbox"/> Sentencing <input type="checkbox"/> Penalties	
<b>51b</b> If there has been prosecution, is there any evidence that publicising the prosecution has resulted in a change in consumer behaviour?	<input type="checkbox"/> Yes <input type="checkbox"/> No		
<b>52</b> How has targeting of legal instruments to control trade influenced their effectiveness?	<input type="checkbox"/> More effective when targeted as a series of interventions across the trade chain <input type="checkbox"/> Equally effective when targeted at one point along the trade chain <input type="checkbox"/> Other:		
<b>53</b> Where an intervention is effective at controlling trade along one trade route, is there evidence of the trade shifting to a new route?	<input type="checkbox"/> Yes <input type="checkbox"/> No		
<b>54a</b> Are there socio-cultural norms or traditions in place within harvester communities which restrict harvest and/or trade?	<input type="checkbox"/> Yes, norms currently exist <input type="checkbox"/> Yes, norms existed in the past but no longer <input type="checkbox"/> No, norms do not exist		
<b>54b</b> If yes, is there evidence that these local norms have been effective in reducing harvesting volumes?	<input type="checkbox"/> Yes <input type="checkbox"/> No		
<b>55a</b> Use of non-legally-binding agreements to regulate trade in the product: - Are there any <u>trade policies</u> ? o If yes, how effective have these been? o Where along the trade chain have they been most effective?  - Are there <u>artificially manipulated market prices</u> ? o If yes, how effective have these been? o Where along the trade chain have they been most effective?	<input type="checkbox"/> Yes or <input type="checkbox"/> No <input type="checkbox"/> Very or <input type="checkbox"/> Somewhat or <input type="checkbox"/> Slightly or <input type="checkbox"/> Not effective <input type="checkbox"/> Site of harvest or <input type="checkbox"/> Point of first sale or <input type="checkbox"/> Area market or <input type="checkbox"/> Nat'l market or <input type="checkbox"/> Point of export or <input type="checkbox"/> Int'l market  <input type="checkbox"/> Yes or <input type="checkbox"/> No <input type="checkbox"/> Very or <input type="checkbox"/> Somewhat or <input type="checkbox"/> Slightly or <input type="checkbox"/> Not effective <input type="checkbox"/> Site of harvest or <input type="checkbox"/> Point of first sale or <input type="checkbox"/> Area market or		

What's Driving the Wildlife Trade?

Questions – Harvesting, Trade and Consumption	Answer Choices	Confidence	Comments
<ul style="list-style-type: none"> <li>- Are there any <u>voluntarily reduced harvests</u>?</li> <li>o If yes, how effective have these been?</li> <li>o Where along the trade chain have they been most effective?</li>   <li>- Are there any <u>seasonally reduced harvests</u>?</li> <li>o If yes, how effective have these been?</li> <li>o Where along the trade chain have they been most effective?</li>   <li>- Any other non-legally binding agreements?</li> <li style="padding-left: 20px;"><i>Please list.</i></li> <li>o If yes, how effective have these been?</li> <li>o Where along the trade chain have they been most effective?</li> </ul>	<input type="checkbox"/> Nat'l market <i>or</i> <input type="checkbox"/> Point of export <i>or</i> <input type="checkbox"/> Int'l market  <input type="checkbox"/> Yes <i>or</i> <input type="checkbox"/> No <input type="checkbox"/> Very <i>or</i> <input type="checkbox"/> Somewhat <i>or</i> <input type="checkbox"/> Slightly <i>or</i> <input type="checkbox"/> Not effective <input type="checkbox"/> Site of harvest <i>or</i> <input type="checkbox"/> Point of first sale <i>or</i> <input type="checkbox"/> Area market <i>or</i> <input type="checkbox"/> Nat'l market <i>or</i> <input type="checkbox"/> Point of export <i>or</i> <input type="checkbox"/> Int'l market  <input type="checkbox"/> Yes <i>or</i> <input type="checkbox"/> No <input type="checkbox"/> Very <i>or</i> <input type="checkbox"/> Somewhat <i>or</i> <input type="checkbox"/> Slightly <i>or</i> <input type="checkbox"/> Not effective <input type="checkbox"/> Site of harvest <i>or</i> <input type="checkbox"/> Point of first sale <i>or</i> <input type="checkbox"/> Area market <i>or</i> <input type="checkbox"/> Nat'l market <i>or</i> <input type="checkbox"/> Point of export <i>or</i> <input type="checkbox"/> Int'l market  <input type="checkbox"/> Yes <i>or</i> <input type="checkbox"/> No  <input type="checkbox"/> Very <i>or</i> <input type="checkbox"/> Somewhat <i>or</i> <input type="checkbox"/> Slightly <i>or</i> <input type="checkbox"/> Not effective <input type="checkbox"/> Site of harvest <i>or</i> <input type="checkbox"/> Point of first sale <i>or</i> <input type="checkbox"/> Area market <i>or</i> <input type="checkbox"/> Nat'l market <i>or</i> <input type="checkbox"/> Point of export <i>or</i> <input type="checkbox"/> Int'l market		
<p><b>56</b> How has targeting of non-legally binding instruments to control trade influenced their effectiveness?</p>	<input type="checkbox"/> More effective when targeted as a series of interventions across the trade chain <input type="checkbox"/> Equally effective when targeted at one point along the trade chain <input type="checkbox"/> Other:		
<p><b>57a</b> Use of <u>incentives</u> to influence <u>legal</u> trade in the product:</p> <ul style="list-style-type: none"> <li>- Are there any <u>buying agreements</u>?</li> <li>o If yes, how effective have these been?</li> <li>o Where along the trade chain have they been most effective?</li>   <li>- Are there any <u>certifications</u>?</li> <li>o If yes, how effective have these been?</li> <li>o Where along the trade chain have they been most effective?</li>   <li>- Are there any <u>tax incentives</u>?</li> <li>o If yes, how effective have these been?</li> <li>o Where along the trade chain have they been most effective?</li>   <li>- Any other incentives?</li> <li style="padding-left: 20px;"><i>Please list.</i></li> <li>o If so, how effective have these been?</li> <li>o Where along the trade chain have they been most effective?</li> </ul>	<input type="checkbox"/> Yes <i>or</i> <input type="checkbox"/> No <input type="checkbox"/> Very <i>or</i> <input type="checkbox"/> Somewhat <i>or</i> <input type="checkbox"/> Slightly <i>or</i> <input type="checkbox"/> Not effective <input type="checkbox"/> Site of harvest <i>or</i> <input type="checkbox"/> Point of first sale <i>or</i> <input type="checkbox"/> Area market <i>or</i> <input type="checkbox"/> Nat'l market <i>or</i> <input type="checkbox"/> Point of export <i>or</i> <input type="checkbox"/> Int'l market  <input type="checkbox"/> Yes <i>or</i> <input type="checkbox"/> No <input type="checkbox"/> Very <i>or</i> <input type="checkbox"/> Somewhat <i>or</i> <input type="checkbox"/> Slightly <i>or</i> <input type="checkbox"/> Not effective <input type="checkbox"/> Site of harvest <i>or</i> <input type="checkbox"/> Point of first sale <i>or</i> <input type="checkbox"/> Area market <i>or</i> <input type="checkbox"/> Nat'l market <i>or</i> <input type="checkbox"/> Point of export <i>or</i> <input type="checkbox"/> Int'l market  <input type="checkbox"/> Yes <i>or</i> <input type="checkbox"/> No <input type="checkbox"/> Very <i>or</i> <input type="checkbox"/> Somewhat <i>or</i> <input type="checkbox"/> Slightly <i>or</i> <input type="checkbox"/> Not effective <input type="checkbox"/> Site of harvest <i>or</i> <input type="checkbox"/> Point of first sale <i>or</i> <input type="checkbox"/> Area market <i>or</i> <input type="checkbox"/> Nat'l market <i>or</i> <input type="checkbox"/> Point of export <i>or</i> <input type="checkbox"/> Int'l market  <input type="checkbox"/> Yes <i>or</i> <input type="checkbox"/> No  <input type="checkbox"/> Very <i>or</i> <input type="checkbox"/> Somewhat <i>or</i> <input type="checkbox"/> Slightly <i>or</i> <input type="checkbox"/> Not effective <input type="checkbox"/> Site of harvest <i>or</i> <input type="checkbox"/> Point of first sale <i>or</i> <input type="checkbox"/> Area market <i>or</i> <input type="checkbox"/> Nat'l market <i>or</i> <input type="checkbox"/> Point of export <i>or</i> <input type="checkbox"/> Int'l market		
<p><b>57b</b> How has targeting of incentives influenced their effectiveness?</p>	<input type="checkbox"/> More effective when targeted as a series of interventions across the trade chain <input type="checkbox"/> Equally effective when targeted at one point along the trade chain <input type="checkbox"/> Other:		

What's Driving the Wildlife Trade?

Questions – Harvesting, Trade and Consumption	Answer Choices	Confidence	Comments
58 What is the tenure arrangement over the species harvested?	<input type="checkbox"/> Private <input type="checkbox"/> State <input type="checkbox"/> Communal <input type="checkbox"/> Open access		
59 What are the characteristics of harvest access rights?	<input type="checkbox"/> Secure and permanent (e.g. private) <input type="checkbox"/> Secure with long term tenure (e.g. 20 year) <input type="checkbox"/> Secure short term (e.g. concession) <input type="checkbox"/> Insecure (e.g. no formal rights, open access, common property)		
60 Where are most natural resources harvested from:	<input type="checkbox"/> State lands <input type="checkbox"/> Communal lands <input type="checkbox"/> Own lands <input type="checkbox"/> Others' lands <input type="checkbox"/> Variable/mixed type areas		
61a Have there been changes in land tenure (from communal/state to private) in areas where this product is harvested over the past 10 years?	<input type="checkbox"/> Yes, from communal/state to private <input type="checkbox"/> Yes, from private to communal/state <input type="checkbox"/> Yes, from private or communal to protected area <input type="checkbox"/> No changes <input type="checkbox"/> Other:		
61b If yes, how have these changes in land tenure affected levels of harvest?	<input type="checkbox"/> Have caused harvest to increase <input type="checkbox"/> Have caused harvest to decrease <input type="checkbox"/> Results have been variable <input type="checkbox"/> No effect on harvest		
62a Have there been changes in species/resource tenure in areas where this product is harvested over the past 10 years?	<input type="checkbox"/> Yes, from communal/state to private <input type="checkbox"/> Yes, from private to communal/state <input type="checkbox"/> Yes, from private or communal to protected area <input type="checkbox"/> No changes <input type="checkbox"/> Other:		
62b Have changes in species/resource tenure (from communal/state to private) affected levels of harvest:	<input type="checkbox"/> Have caused harvest to increase <input type="checkbox"/> Have caused harvest to decrease <input type="checkbox"/> Results have been variable <input type="checkbox"/> No effect on harvest		
63a Has access to the species/product been affected by an increased trade in the species?	<input type="checkbox"/> Yes, access has been reduced <input type="checkbox"/> Yes, access has increased <input type="checkbox"/> No, access has not been affected		
63b Has access to the land where harvesting takes place been affected by increased trade in the species?	<input type="checkbox"/> Yes, access has been reduced <input type="checkbox"/> Yes, access has increased <input type="checkbox"/> No, access has not been affected		
64 Are there traditional norms in place governing local resource use?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Uncertain		
65a Is there evidence of immigrants moving into harvest areas and seeking to capture the economic benefits of wildlife trade over the past 10 years?	<input type="checkbox"/> Yes <input type="checkbox"/> No		
65b If yes, do these immigrants have the same resource access rights as local people ( <i>vis a vis</i> this product)?	<input type="checkbox"/> Yes <input type="checkbox"/> No		

What's Driving the Wildlife Trade?

Questions – Harvesting, Trade and Consumption	Answer Choices	Confidence	Comments
<b>66a</b> Have there been any targeted consumer awareness campaigns to reduce consumption of the product (including encouraging consumption of substitute products)?	<input type="checkbox"/> Yes <input type="checkbox"/> No		
<b>66b</b> If yes (to 66a), is there evidence that consumer awareness has led to changes in consumer behaviour?	<input type="checkbox"/> Yes <input type="checkbox"/> No		
<b>66c</b> If yes (to 66b), how long have the changes lasted?	<input type="checkbox"/> Less than 1 year or <input type="checkbox"/> 1-5 years or <input type="checkbox"/> 6-10 years or <input type="checkbox"/> More than 10 years		
<b>66d</b> If consumption has declined, have harvesting rates also declined?	<input type="checkbox"/> Yes, harvesting has declined <input type="checkbox"/> No, harvesting has not declined <input type="checkbox"/> Consumption has not declined		
<b>67a</b> Have there been any interventions to increase awareness among <u>harvesters</u> of - the illegality of wildlife trade - the negative environmental impacts of wildlife trade	<input type="checkbox"/> Yes or <input type="checkbox"/> No <input type="checkbox"/> Yes or <input type="checkbox"/> No		
<b>67b</b> If yes, is there any evidence that awareness has increased among harvesters?	<input type="checkbox"/> Yes <input type="checkbox"/> No		
<b>67c</b> If yes, is there any evidence that harvesters have reduced harvesting as a result of increased awareness?	<input type="checkbox"/> Yes <input type="checkbox"/> No		
<b>68a</b> Have there been any interventions to increase awareness among <u>traders</u> of - the illegality of wildlife trade - the negative environmental impacts of wildlife trade	<input type="checkbox"/> Yes or <input type="checkbox"/> No <input type="checkbox"/> Yes or <input type="checkbox"/> No		
<b>68b</b> If yes, is there evidence that awareness has increased among traders?	<input type="checkbox"/> Yes <input type="checkbox"/> No		
<b>68c</b> Is there evidence that this increased awareness has reduced volume traded?	<input type="checkbox"/> Yes <input type="checkbox"/> No		
<b>69a</b> Has any external technical support been provided to improve harvesting and management practices?	<input type="checkbox"/> Yes <input type="checkbox"/> No		
<b>69b</b> If yes (to 69a), how effective have these quotas been in regulating trade? - Why? Please explain briefly.	<input type="checkbox"/> Very or <input type="checkbox"/> Somewhat or <input type="checkbox"/> Slightly or <input type="checkbox"/> Not effective		
<b>70</b> What is the natural rate of reproduction of the species (as a factor of combined lifespan, maturity, fecundity, ecological adaptability)?	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High		
<b>71</b> What have the trends been over the past 10 years? - Extent of habitat for species in harvest area has - Quality of habitat for species in harvest area has - Abundance of species in harvest area has  - Total amount of harvest has - Time required to harvest the same quantity has - Catch per unit effort has - Quality of raw harvested product has	<input type="checkbox"/> Increased or <input type="checkbox"/> Decreased or <input type="checkbox"/> No clear trend <input type="checkbox"/> Increased or <input type="checkbox"/> Decreased or <input type="checkbox"/> No clear trend <input type="checkbox"/> Increased or <input type="checkbox"/> Decreased or <input type="checkbox"/> No clear trend  <input type="checkbox"/> Increased or <input type="checkbox"/> Decreased or <input type="checkbox"/> No clear trend <input type="checkbox"/> Increased or <input type="checkbox"/> Decreased or <input type="checkbox"/> No clear trend <input type="checkbox"/> Increased or <input type="checkbox"/> Decreased or <input type="checkbox"/> No clear trend <input type="checkbox"/> Increased or <input type="checkbox"/> Decreased or <input type="checkbox"/> No clear trend		
<b>72</b> Is there evidence of harvesting moving to different areas in response to	<input type="checkbox"/> Yes		

What's Driving the Wildlife Trade?

Questions – Harvesting, Trade and Consumption	Answer Choices	Confidence	Comments
over-harvesting of the species in traditional harvest areas over the past 10 years?	<input type="checkbox"/> No		
<b>73a</b> Is there a formal management plan for the species?	<input type="checkbox"/> Yes <input type="checkbox"/> No		
<b>73b</b> If yes, how effective has implementation been? - Why? Please explain briefly.	<input type="checkbox"/> Very or <input type="checkbox"/> Somewhat or <input type="checkbox"/> Slightly or <input type="checkbox"/> Not effective		
<b>74</b> What methods are used to monitor the wild population? Select all that apply.	<input type="checkbox"/> Direct population estimates <input type="checkbox"/> Quantitative indices (e.g. relative density based on surveys) <input type="checkbox"/> Qualitative indices (e.g. rapid appraisal, extrapolation from harvest monitoring) <input type="checkbox"/> Anecdotal, observation-based <input type="checkbox"/> No monitoring has taken place		
<b>75</b> What methods are used to monitor harvest? Select all that apply.	<input type="checkbox"/> Direct harvest estimates <input type="checkbox"/> Quantitative indices <input type="checkbox"/> Qualitative indices <input type="checkbox"/> National monitoring of exports <input type="checkbox"/> No monitoring has taken place		
<b>76</b> What methods are being used to control harvest? - Are there any <u>harvest quotas</u> ? o If yes, how effective have these been?  - Are there <u>CITES export quotas</u> ? o If yes, how effective have these been?  - Are there <u>closed seasons</u> ? o If yes, how effective have these been?  - Is there <u>zoning</u> /are there <u>protected areas</u> ? o If yes, how effective have these been?  - Are there any <u>technology limits</u> ? o If yes, how effective have these been?  - Are there <u>size/age limits of individuals harvested</u> ? o If yes, how effective have these been?  - Are there <u>traditional norms</u> ? o If yes, how effective have these been?  - Any other methods used to control harvest? Please list. o If yes, how effective have these been?	<input type="checkbox"/> Yes or <input type="checkbox"/> No <input type="checkbox"/> Very or <input type="checkbox"/> Somewhat or <input type="checkbox"/> Slightly or <input type="checkbox"/> Not effective  <input type="checkbox"/> Yes or <input type="checkbox"/> No <input type="checkbox"/> Very or <input type="checkbox"/> Somewhat or <input type="checkbox"/> Slightly or <input type="checkbox"/> Not effective  <input type="checkbox"/> Yes or <input type="checkbox"/> No <input type="checkbox"/> Very or <input type="checkbox"/> Somewhat or <input type="checkbox"/> Slightly or <input type="checkbox"/> Not effective  <input type="checkbox"/> Yes or <input type="checkbox"/> No <input type="checkbox"/> Very or <input type="checkbox"/> Somewhat or <input type="checkbox"/> Slightly or <input type="checkbox"/> Not effective  <input type="checkbox"/> Yes or <input type="checkbox"/> No <input type="checkbox"/> Very or <input type="checkbox"/> Somewhat or <input type="checkbox"/> Slightly or <input type="checkbox"/> Not effective  <input type="checkbox"/> Yes or <input type="checkbox"/> No <input type="checkbox"/> Very or <input type="checkbox"/> Somewhat or <input type="checkbox"/> Slightly or <input type="checkbox"/> Not effective  <input type="checkbox"/> Yes or <input type="checkbox"/> No <input type="checkbox"/> Very or <input type="checkbox"/> Somewhat or <input type="checkbox"/> Slightly or <input type="checkbox"/> Not effective		

## ANNEX 2:

### A sample of expert opinions of key actions required to reduce the illegal and unsustainable wildlife trade provided during the second project workshop

<p><b>Governance, regulations and enforcement</b></p>	<ul style="list-style-type: none"> <li>• Generate the political will to move from 'paper-only' initiatives to practical action, e.g. by:             <ul style="list-style-type: none"> <li>- Creating the conditions whereby leaders within the region advocating that wildlife be protected and trade be addressed, taking genuine pride in their position on this issue;</li> <li>- Establishing "model countries" for wildlife protection; supported by donor communities through some certification process e.g. 'Green country of the year' – possibly linked to increases in tourism;</li> <li>- Linking aid to actions on the wildlife trade, e.g. loans from the World Bank's International Development Association (IDA);</li> <li>- Linking qualification for hosting international events such as the Olympics or south-east Asian Games to controlling illegal trade;</li> <li>- Increasing research and publication of the evidence of illegal trade,</li> </ul> </li> <li>• Draw links between wider governance and security issues and the illegal wildlife trade, e.g. through making achievement of 'developed nation' status contingent on actions relating to the wildlife trade.</li> <li>• Address issues of corruption in implementing wildlife trade controls, e.g. among Customs and other regulatory authorities in exporting countries, through advocacy supported by evidence-based on research;</li> <li>• Strengthen the implementation of existing tools, e.g. CITES and the ASEAN Wildlife Enforcement Network (ASEAN-WEN)</li> <li>• Increase the level of penalties for illegal trade such that they form a deterrent, including through linking licensing (e.g. to restaurant owners) to adherence to wildlife trade codes of practice</li> <li>• Increase support from importing countries, particularly China, for implementation of international trade controls, e.g. by:             <ul style="list-style-type: none"> <li>- Establishing laws in importing countries that define imports as illegal if they involve goods exported illegally;</li> <li>- Suspension of imports of goods where there is concern regarding sustainability;</li> <li>- Encouraging China's leadership role in the region to include active support for a shift from illegal and unsustainable wildlife consumption to a stewardship economy for the wildlife trade</li> </ul> </li> <li>• Improve enforcement of existing wildlife trade regulations, e.g. through increased:             <ul style="list-style-type: none"> <li>- Action by enforcement agencies and the judicial sector generally;</li> <li>- Collaboration among countries in investigating illegal trade;</li> <li>- Research on and capacity to use forensic techniques to assist in trade monitoring;</li> <li>- .Application of quarantine controls, tax laws and other trade-related regulations and controls that are available;</li> <li>- Enforcement of trade controls at the level of importers/retailers;</li> <li>- Communication of enforcement related information to the right people so that it can actually influence action on the ground</li> </ul> </li> <li>• Address the issue of stockpiling to take advantage of the higher prices associated with increased scarcity</li> <li>• Increase attention to the need for airlines to enforce International Air Transport Association (IATA) regulations, including through raising awareness among the industry itself and raising the capacity of associated government enforcement personnel.</li> </ul>
<p><b>Communications</b></p>	<ul style="list-style-type: none"> <li>• Undertake research and publish information to highlight the problem of the illegal wildlife trade and support the case for interventions (i.e. an evidence-based approach);</li> <li>• Communicate and promote research findings, e.g. via a high profile summit to obtain political backing, for example by involving national political leaders, to build political will;</li> <li>• Increase awareness of harvesters of wildlife trade laws (with a lower focus on intermediaries)</li> <li>• Undertake awareness activities to make end-consumers more aware of what wildlife trade is illegal, bearing in mind that awareness is generally very low in the region for most species</li> <li>• Work to change consumer behaviour related to belief systems, e.g. to alter beliefs about medicines, tonic foods or those that confer 'power', raise awareness of the potential health risks of eating wild species, and the effectiveness of synthetic substitutes, possibly making use of existing networks or structures, e.g. traditional medicine networks, and by increasing the political will to communicate such messages;</li> <li>• Increase awareness amongst other actors in the value chain, e.g., transporters who sometimes do not realize that they are involved in illegal activities.</li> </ul>
<p><b>Research</b></p>	<ul style="list-style-type: none"> <li>• Identify information about the changes in trade that are occurring;</li> <li>• Increase transparency of market chains, including as this relates to benefit flows, and paying attention to the role of intermediaries;</li> <li>• Undertake research to provide evidence of the need to increase interventions</li> </ul>
<p><b>Non-regulatory incentives</b></p>	<ul style="list-style-type: none"> <li>• Consider making use of a name and shame approach with individuals and/or companies involved in illegal trade (it was noted that this approach could have negative consequences that could outweigh positive impacts);</li> <li>• Make consideration of illegality issues part of the wider business environment including in relation to the wider issue of corporate social responsibility</li> <li>• Explore options of 'eco-certification', for example of airlines that meet certain criteria, e.g. cease to carry wildlife products</li> </ul>

## ANNEX 3: Tools to support further exploration of expert knowledge

Thus far, most analyses of the trade in wild species have taken the form of published papers and reports, sometimes incorporating trade chain and trade flow diagrams from producer to consumer countries (e.g. as included in the case studies on Tiger, agarwood, and tortoises and freshwater turtles), but much less frequently using diagrams to illustrate wider trade dynamics. However, a number of different diagrammatic tools are available that could usefully be used to illustrate the wildlife trade and support identification of which interventions are appropriate under different circumstances.

The sustainable livelihood framework, a conceptual model developed by the UK Department for International Development (DFID), supports planning of new development activities and the impacts of existing activities, by illustrating the main factors that affect people's livelihoods and the typical relationships between these factors. The framework stresses the multiple interactions between the various factors affecting livelihoods, while also focusing on core influences and processes (DFID, 2008). Guidance sheets on the framework, and the "sustainable livelihoods approach" of which it is a part, are provided on the "Livelihoods Connect" website (<http://www.livelihoods.org/>).

A simplified conceptual model developed specifically to illustrate frequently observed wildlife trade patterns within south-east Asia was developed by TRAFFIC, and is illustrated below. Trade of all wildlife species, for whatever purposes, can be placed along axes tending towards one of four categories (see Figure 25):

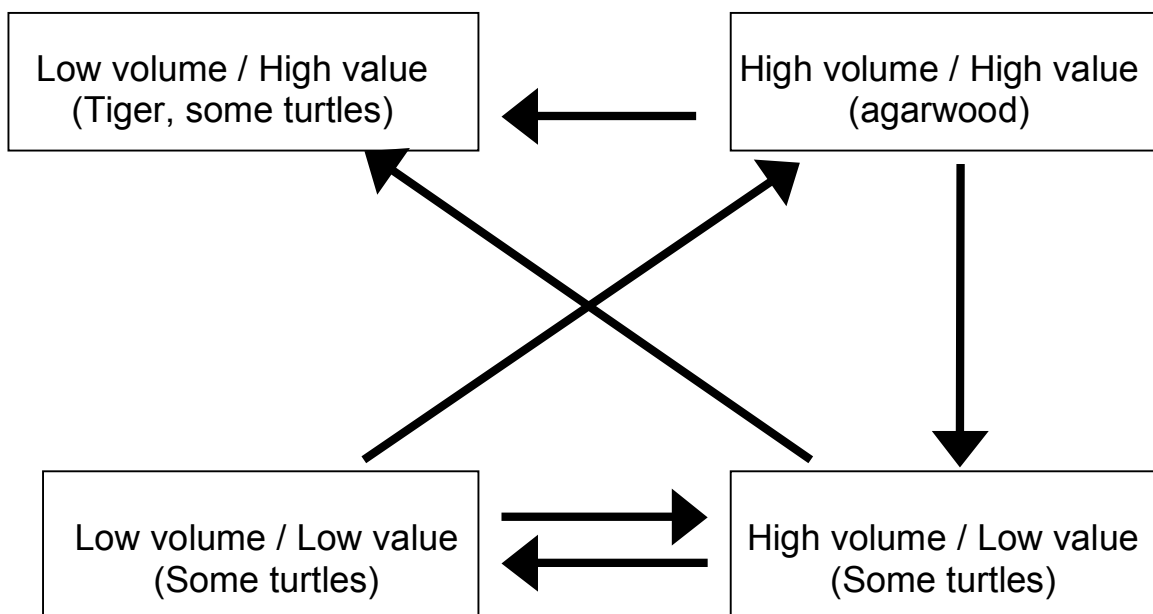
- Low Volume/Low Value
- Low Volume/High Value
- High Volume/Low Value
- High Volume/High Value

This model allows trends to be depicted and predicted, and can be used to help identify where interventions might achieve the greatest impact and/or are needed most urgently. This includes helping identify instances where wildlife populations are not yet threatened, but are likely to decline significantly if trade persists at current levels. Interventions can therefore be targeted with the goal of bringing and/or maintaining trade within sustainable levels rather than trying to ban it outright owing to conservation concerns.

As an illustration, species or groups of species with similar uses frequently move from one category to another as trade trends evolve. In the case of agarwood, for example, what was once a Low Volume/High Value trade (largely because of low numbers of harvesters) moved into a High Volume/High Value trade over the past 30 years, and in some local areas in Indonesia where quality has declined markedly, a High volume/Low value trade dynamic is increasingly evident. Wild populations within Viet Nam have now been over-harvested to the point where trade has moved through High Volume/High Value to what can now be characterised as Low Volume/High Value, owing to scarcity of the resource in the wild. Wild populations in Cambodia and Lao PDR are likely to follow a similar pattern through categories of volume and value if more is not done to bring trade within sustainable levels.

Often, species in the High Volume/Low Value group move to Low Volume/High Value as populations decline from over-harvesting, as their market value typically increases with increasing rarity. In the case of some species, the demand from end-users also shifts as the species decline, e.g. many species of tortoise and freshwater turtle may be sold primarily for human consumption (meat) while still numerous and inexpensive, trade shifting to the pet trade once hobbyists are prepared pay high prices for increasingly rare specimens. Some species, such as island endemic turtles and tortoises that were never common, may enter the Low Volume/High Value group soon after knowledge of their existence among collectors.

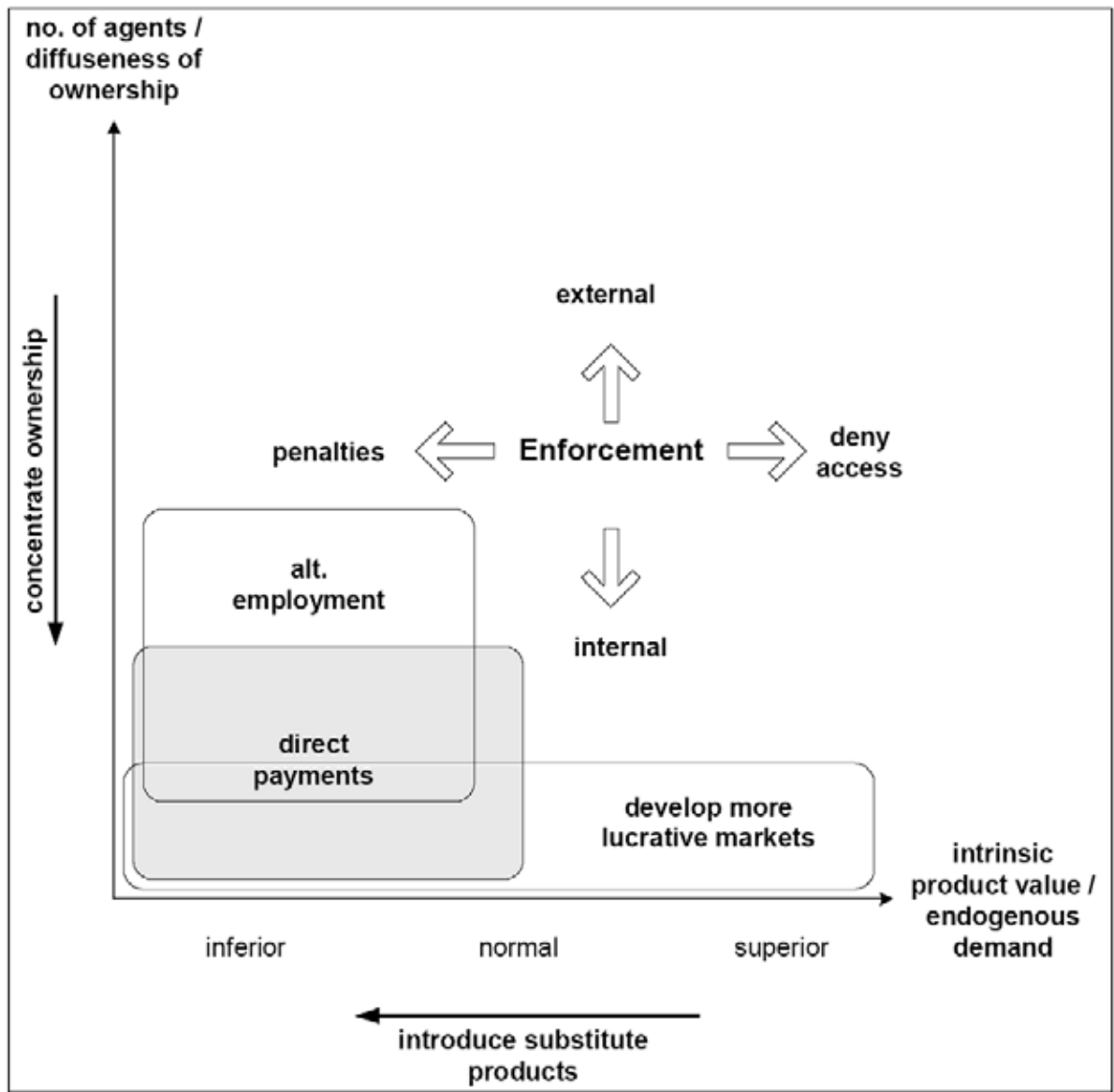
Figure 25: Potential framework for a bio-economic model of the wildlife trade



Source: Nijman *et al.* (in prep.).

Quantitative analytical models are also being developed that may be useful in relation to understanding the wildlife trade and its impacts. The most widely known of these are *bio-economic models*, which have been used to explore the economics of wildlife harvesting (Milner-Gulland and Mace, 1998). Bio-economic models are integrated economic-ecological models, which are generally used to define appropriate levels of stock and amounts harvested, to assist resource management decisions. Such models can therefore provide a useful tool for examining the feedback effects between human activity and natural resources. Based on such an approach, Ling (2004) presents a schematic diagram illustrating how different interventions might usefully be targeted with respect to wildlife products that are traded (Figure 26).

Figure 26: Schematic diagram of interventions, actors, resource ownership and product preference



Source: Ling (2004).

The indicative schematic diagram above illustrates the interventions that are likely to be effective in relation to axes correlated with the number of agents (or actors) and/or the diffuseness of resource ownership, and the strength of preference for the product derived from the resource and/or the demand for it amongst the group of agents in question. The direct payments box is shaded purely as a visual aid. Enforcement is indicated for all cases, but the balance of enforcement strategies varies with conditions as indicated by the arrows. The two interventions of concentrating ownership and introducing substitutes for the product in question are primarily used to alter conditions in order to favour the success of other interventions (Ling, 2004).

## **Elaboration of Bayesian Belief Networks**

Bayesian Belief Networks (BBNs) offer a novel and informative approach for examining the effectiveness of interventions relating to the wildlife trade. BBNs are essentially analytical tools for combining and exploring different forms of evidence, and are particularly useful to situations where such evidence is characterised by a high degree of uncertainty, as in the case of the wildlife trade. BBNs represent the relationship between variables in the form of probabilities, enabling many different sources of data to be integrated and analysed according to a common framework. Presentation of model output in the form of probabilities has the added advantage of being relevant to the needs of decision-makers, who in the context of the wildlife trade require an assessment of risk associated with a particular intervention option.

The objective of this project was to define under what circumstances particular intervention options would be most likely to succeed. Evidence was collected in the form of expert knowledge, elicited using a questionnaire approach. The information was therefore collected in a way appropriate for exploration using a BBN, building on recent experience applying this method to analysis of non-timber forest product (NTFP) commercialization (Newton *et al.*, 2006).

### **A Bayesian Belief Network of the wildlife trade**

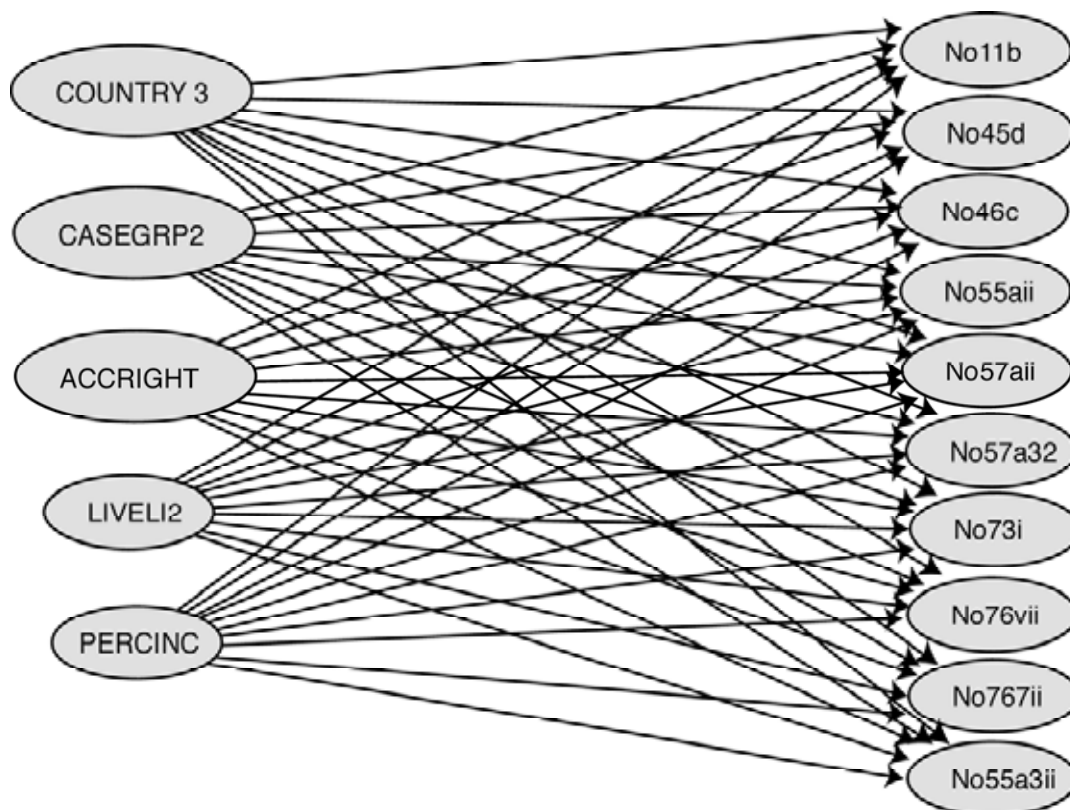
A network was constructed using the information obtained from the questionnaire survey. In each case, the aim was to use the BBN as a model, to predict the likely effectiveness of different interventions for different case study characteristics. The characteristics that were explored were selected focal product groups (Tiger, agarwood, tortoises and freshwater turtles), country where harvested, access rights, importance to livelihoods, and percentage of income derived from the trade. Using the BBN model, it was possible to assess which intervention options would be most likely to be successful for these groups.

The BBN was constructed using the Hugin Developer 6.3 inference engine (Hugin Expert A/S, Aalborg, Denmark, <http://www.hugin.com/>). In each case, variables were represented as nodes in the networks, and connected by arrows (directed links), which are indications of conditional dependence. A link between two nodes, from node A (parent node) to node B (child node), indicates that A and B are functionally related, or that A and B are statistically correlated. Each child node (i.e. a node linked to one or more parents) contains a conditional probability table (CPT). The CPT gives the conditional probability for the node being in a specific state given the configuration of the states of its parent nodes. When networks are compiled, Bayes' theorem is applied according to the values in the CPT, so that changes in the probability distribution for the states at node A are reflected in changes in the probability distribution for the states at node B. A BBN can be explored by changing the states of the nodes (or variables) incorporated within the model. When the state of a variable is known, it is said to be instantiated (Jensen, 2001). Once a node has been instantiated, then this will influence the probabilities associated with the states of other nodes to which it is linked, according to the values in the CPTs.

One of the features of a BBN is that the values in the CPTs can be "learned" from data (in this way, BBNs can be considered as a form of artificial intelligence). The process of refining the conditional probabilities in the CPTs is referred to as "sequential learning", which involves incrementally updating the knowledge incorporated in the network. The sequential learning algorithm implemented in Hugin is described by Spiegelhalter and Lauritzen (1990); see also Cowel and Dawid (1992) and Olesen *et al.* (1992). The procedure sequentially updates the initial values given in the CPTs by incorporating values derived from different cases. The algorithm performs a series of iterations, and maximizes the logarithm of the probability of the case data given the current joint probability distribution (Hugin, 2003). In this case, the probability values in the CPTs were derived from the questionnaire data using the sequential learning process. Outcomes were provided in the form of probabilities associated with different states of the node representing effectiveness of the intervention.

The BBN was constructed with a simple structure (Figure 27). Nodes representing the characteristics of the case study groups, with a state defined for each of the types considered, were each connected to single nodes representing the effectiveness of the intervention, each of which was given four states according to the scoring approach adopted (“very effective”; “somewhat effective”; “slightly effective”; “not effective”).

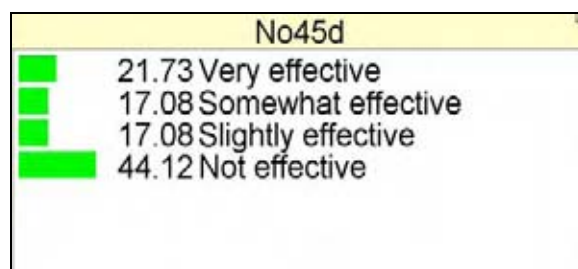
**Figure 27: Structure of an example BBN for examining the effectiveness of trade interventions**



The nodes on the left hand side represent different characteristics of the case studies (for example “country3” is the country where the product is harvested, and “accright” is the access rights of the harvesters, etc.). The nodes on the right hand side represent different interventions (numbered here in accordance with their numbering on the questionnaire).

The outputs of the BBN are provided in the form of probabilities of a particular intervention being effective. The BBN provides an indication of the likelihood of each of the four possible outcomes of an intervention as elicited during the questionnaire survey (Figure 28). The bars and numbers represent the probabilities associated with the four different outcomes, providing an indication of the likely effectiveness of this particular intervention.

**Figure 28: Example of results obtained using BBN analysis**



A series of analyses were performed using this BBN, incorporating the questionnaire data, to assess the potential of the BBN to help identify which interventions would be most likely to succeed for different case study groupings. Ten different intervention types were considered. The results indicate how the intervention type most likely to be very or somewhat effective varies between case study groups (Table 6); country of origin (Table 7); security of access to the resource (Table 8); and different levels of income provided by the wildlife trade (Table 9). In each case, the intervention marked by an asterisk is the one associated with the highest probability in being either “very” or “somewhat effective”, as inferred by the BBN. “None” indicates that neither of these categories was associated with a probability of > 25%. Owing to the very small sample sizes for some groupings, these results should be considered as illustrative of the approach rather than indicative of likely outcomes. Nevertheless, an interesting pattern emerges in relation to the use of harvest licences and permits, these emerging as the most likely to be effective for the majority of groupings considered. As might be expected, these intervention types do not appear as effective interventions for Tigers, trade in which is banned, with species management plans instead found to be the most effective of the intervention types for this case study group.

**Table 6: BBN prediction of which intervention is the most likely to be most effective for different case study product groups**

Intervention	Agarwood	Turtles	Tiger
External interventions aimed at poverty reduction (Q11b)			
Harvest quotas (Q45d)		*	
Harvest licences / permits (Q46c)	*		
Voluntarily reduced harvests (Q55a3)			
Trade policies (Q55a1)			
Tax incentives (Q57a3)			
Buying agreements (Q57a1)			
Species management plan (Q73)			*
Traditional norms (Q76.7.1)			
Closed seasons (Q76.3.2)			

**Table 7: BBN prediction of which intervention is the most likely to be most effective for different countries of origin**

Intervention	Lao PDR	Vietnam	Cambodia	Indonesia
External interventions aimed at poverty reduction (Q11b)				
Harvest quotas (Q45d)				
Harvest licences/permits (Q46c)	*	*	*	
Voluntarily reduced harvests (Q55a3)				
Trade policies (Q55a1)				
Tax incentives (Q57a3)				
Buying agreements (Q57a1)				
Species management plan (Q73)				*
Traditional norms (Q76.7.1)				
Closed seasons (Q76.3.2)				

Harvest licences/permits again emerged as the most effective intervention type of those tested in relation to the three of the four target countries. In Indonesia, however, species management plans were the intervention most likely to be at least somewhat effective, followed by harvest licences/permits.

**Table 8: BBN prediction of which intervention is the most likely to be most effective for different levels of security of access to the resource**

Intervention	Insecure	Secure long term	Secure and permanent
External interventions aimed at poverty reduction (Q11b)			
Harvest quotas (Q45d)			
Harvest licences / permits (Q46c)	*	*	*
Voluntarily reduced harvests (Q55a3)			
Trade policies (Q55a1)			
Tax incentives (Q57a3)			
Buying agreements (Q57a1)			
Species management plan (Q73)			
Traditional norms (Q76.7.1)			
Closed seasons (Q76.3.2)			

**Table 9: BBN prediction of which intervention is the most likely to be most effective for different levels of income provided by the wildlife trade**

Intervention	Less than a quarter of annual income	Quarter to half of annual income	Half to three quarters of annual income	More than three quarters of annual income
External interventions aimed at poverty reduction (Q11b)				
Harvest quotas (Q45d)				
Harvest licences / permits (Q46c)	*		*	*
Voluntarily reduced harvests (Q55a3)				
Trade policies (Q55a1)				
Tax incentives (Q57a3)				
Buying agreements (Q57a1)				
Species management plan (Q73)		*		
Traditional norms (Q76.7.1)				
Closed seasons (Q76.3.2)				

These results highlight how a BBN can be used to explore the potential effectiveness of different interventions, and to identify which intervention is most likely to be effective under a given set of circumstances. The preliminary analyses presented here also illustrate how the method could be used to provide a decision-support tool regarding intervention choices. Obviously the reliability of the outcomes depends on the reliability of the probabilities incorporated in the CPTs, which ultimately depend on the reliability of the underlying data. However, the approach developed under this project could be developed further, for example by incorporating evidence from other sources (such as trade data) or from additional experts. As additional evidence becomes available, from a variety of such sources, it could readily be

incorporated in the network using its learning feature. Furthermore, a more comprehensive list of potential interventions and product characteristics could potentially be included.

It is also possible to generate predictions for different combinations of characteristics. For example, in the case of agarwood in Indonesia, in situations where trade is very important to livelihoods, the intervention predicted by the BBN as most likely to be very effective was harvest quotas (with a probability of 0.40). In the case of turtles, in situation where the trade is very important to livelihoods, two interventions (harvest quotas and licences/permits) were both predicted to be highly likely to be very effective (probability values >0.57). BBN outputs could also be of value in highlighting situations where the risk of failure of a particular intervention would likely be high.

One of the key characteristics of the wildlife trade is the high degree of uncertainty, not only in terms of the potential effectiveness of interventions, but also in terms of its importance to livelihoods and even the amount of trade taking place. One of the useful features of BBNs is that they allow such uncertainty to be explored, for example by varying the probabilities incorporated in the CPTs. It would be possible, for example, to explore the sensitivity of model output to the uncertainty associated with the questionnaire responses, or any other form of evidence that was available. Conflicts between different sources of evidence can also readily be identified, which can help focus future data-gathering efforts. Another approach that can readily be achieved using BBNs is the weighting of different sources of evidence, depending on their reliability. For example, the assessment of confidence in responses elicited during the questionnaire survey could potentially be used to weight the beliefs of different respondents, and the impacts on model output explored. Such exploration of a BBN model could enable the likely effectiveness of different interventions under different circumstances to be more fully explored. The value of this approach would be strengthened significantly, however, if additional evidence were incorporated in the model.



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