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# C-Change Community of Practice Meeting: Community Partners' Feedback and Follow-up

REPORT

## Case Study: Perth-Andover, New Brunswick

**Prepared for:** C-Change Community of Practice Meeting (October 27, 2012)
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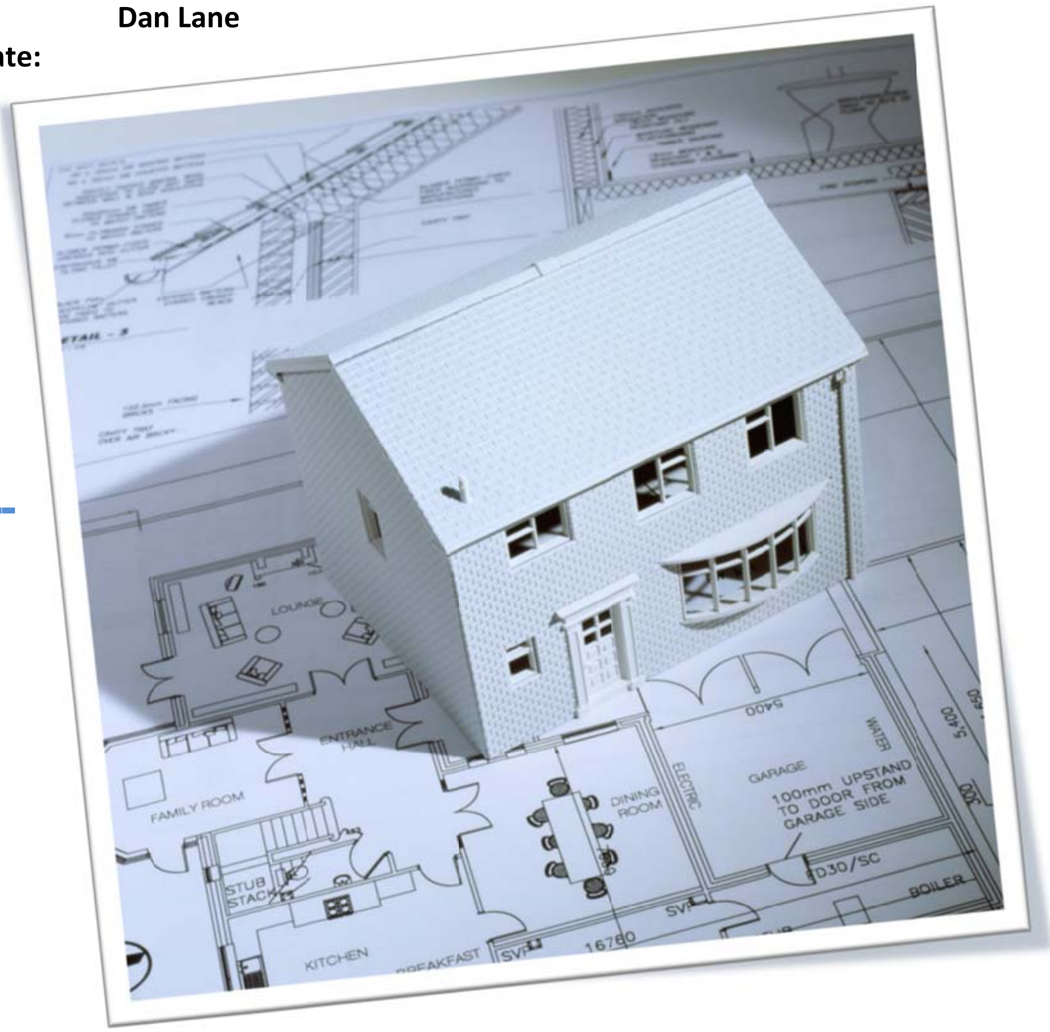

**January 3**


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# C-Change Community of Practice Meeting – Follow-up

## Case Study: Perth-Andover, New Brunswick

This report presents the follow-up to the C-Change Case Study used in the Community of Practice meeting held in Ottawa, October 29-31, 2012 and as presented to the C-Change Community Partners from Canada and the Caribbean region (Lane 2012). The Case Study was used to illustrate: (i) formulation of the community strategic problem; (ii) setting of community priorities and the management of risk; (iii) development of alternative strategies; and (v) evaluation of strategies in support of community decision making. (See also the companion Case Study document for details.)

This report is the follow-up and companion to the Community of Practice meeting that includes the feedback of the Community Partners to key inputs used to establish problem priorities and ultimately to present the resulting ranking of alternative adaptation strategies postulated as deal with the problem setting of Perth-Andover Saint John River spring flooding. The Perth-Andover case was selected because it illustrated the scenarios faced by all C-Change communities in Canada and the Caribbean region. This case provided a rich dataset and a mature problem situation that also illustrated how the problem could be applied to the different contexts of the C-Change communities in Canada and the Caribbean. It is anticipated that this case may be used as a "template" for C-Change communities toward the evaluation and decision support for adaptation strategies. As such, the inputs below, while they are expected to reflect C-Change Community Partners' personal perspective gained from experience in their own communities, are meant to apply to the Perth-Andover flooding problem presented to the partners at the Community of Practice meeting.

**Follow-up and Partners' Input**

The purpose of this report is to provide the participating C-Change Community Partners with feedback on the requested input that they kindly provided during the original presentation of the Case Study, October 27, 2013 in Ottawa. These inputs were integral components of the adaptation strategy evaluations for the case and represented the following elements:

I. **Priorities for Community Profile Dimensions –** C-Change Community Partners provided pairwise comparison feedback on the community profile dimensions for: (i) environmental, (ii) economic, (iii) social, and (iv) cultural positions of the community. The pairwise comparison values are used in the Analytic Hierarchy Process (AHP) procedure to determine the weighted priority among the four community profile dimensions.

II. **Utility Measures for Damage Scenarios –** C-Change Community Partners provided subjective feedback on the relative impact of flood damage for Perth-Andover indicators within each of the community profile dimensions. These include the impact of flood damage to: (a) park areas (environmental); (b) roads (economic); (c) seniors' infrastructure (social); and (d) schools (cultural). This information was provided in the form of utility functions used in the evaluation of flood scenario expected impacts and community priorities for the community dimensions.

The Case Study follow-up and results (community priorities, and relative ranking of the adaptation strategies) are presented individually for each C-Change Community Partner, as well as separately for the combined Canadian partners' and the Caribbean partners' results. The individual and combined results are similarly compared to the original Case Study results provided in the original case study report.

This report first summarizes the results (community priorities, and ranked strategies) of the original case (see details in the Case Study Report). These results are followed by the Community Partners inputs and the comparable community priorities, and resulting ranked strategies results compared to the original overall rankings.

**Case Study Problem Background**

The structured framework that provides the basis for attributing the community's strategic perspective to the problem is developed from the Community Profile. The pillars of the Community Profile are aligned with the Integrated Community Sustainability Plans that many municipalities across Canada were required to prepare in 2009-2010 in order to respond to the federal government's request for community input for receiving the *Federal Gas Tax Agreement* fund. (See also the ICSPs for C-Change communities: Charlottetown – Stanec 2010, and Richmond County (and Isle Madame) – Municipality of the County of Richmond 2010). The problem hierarchy of Figure 1 below comprised of the four main critiera that reflect the "sustainability pillars" of the ICSPs as a means of profiling the community as well as categorizing and attributing its threats.

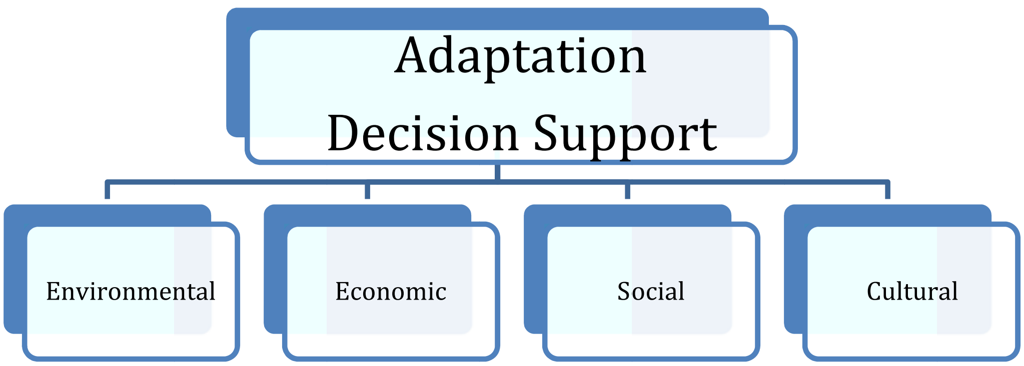



**Figure 1. Structured Community Problem Hierarchy inspired by the ICSPs Sustainability Pillars.**

Given the anticipated impacts of the flood threat to Perth-Andover relative to its current Status Quo, the issue is to discover the community's priorities with respect to protecting its position in each dimension. This information is captured by comparing the relative importance of the community leaders with respect to the dimensions of the community profile, namely, environmental versus economic versus social versus cultural components, as well as their measurable elements.

**I.1. Case Study Evaluation of Community Profile Dimension Priorities**

Each community, and the key participant groups in communities have their own priorities with respect to community well-being. The evaluation of priorities takes place by querying community decision makers on their feedback about "relative importance" of the sustainability profiles by asking questions about the pairwise comparison of the different dimensions. For example, feedback from decision makers on the idea that Environmental considerations for the community are slightly more important compared to the Economic (1.3) or Cultural (1.25) dimensions, but equivalent in importance to the Social dimension (1.0) as shown in Table 1 below:

**Table 1. Pairwise Comparison Matrix for all Sustainability Dimensions**

| | Economic | Social | Cultural |
|---|---|---|---|
| Environmental | 1.3 | 1.0 | 1.25 |
| Economic | - | 1.3 | 1.5 |
| Social | - | - | 1.0 |

The pairwise comparison matrix above provides the opportunity to develop a direct comparison of all dimensions (Saaty 1980). Using this method, the weighted and scaled comparison of the dimensions from the above pairwise relative comparison values yields the following unique weights shown in Table 2 in which the Environmental Pillar is the largest priority community dimension followed by the Economic, Social, and Cultural Pillars in decreasing order of priority.

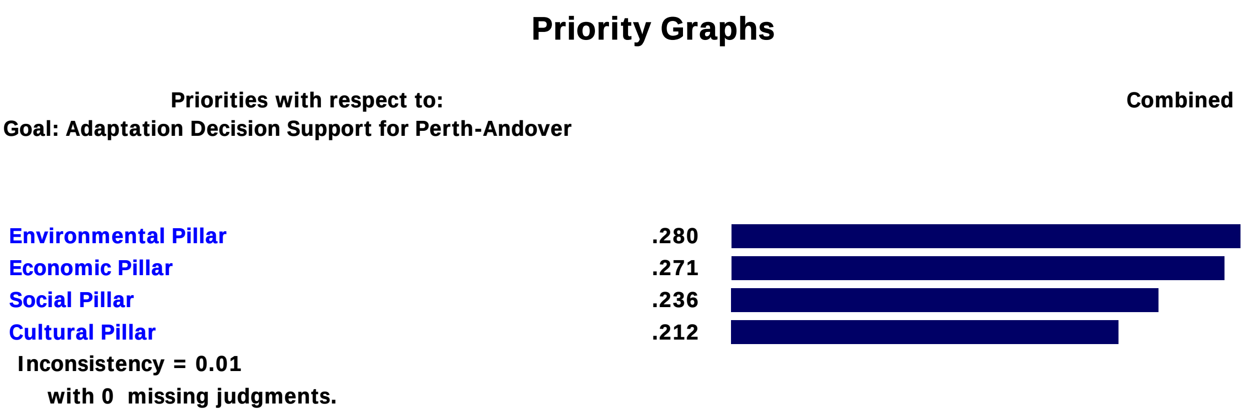



**Table 2. Community Profile Community Priority Weights (Original Case) (Expert Choice 2010)**

The pairwise comparisons are made similarly for each of the elements of the community profile hierarchy. The hierarchy is shown in Table 3 below. The table also includes the weights (derived from pairwise comparison feedback for each grouping) for all hierarchy elements that include the top-level pillars values, as noted in Table 1 above.

Given the structured full problem defined in Table 3 below, the issue now is to evaluate the impacts of the flood scenarios. This involves the community's assessment of risk and the assignment of measures that reflect decision makers' risk attitudes, including the assignment of the utility functions that indicate the decision makers' impact of flood impacts on the community dimensions and impacts.

### II.1. Case Study Utility Measures for Damage Scenarios

The Government of New Brunswick, in August 2012 following the disastrous March flooding in Perth-Andover, developed an analysis of the impacts by Community Profile dimension as well as an analysis of forecast flood scenarios. As their Report stated:

> "The frequency of another event like the March 2012 flood event or worse has been predicted." (p.5) and "…impact maps that indicate the locations and extent of damage, as well as potential relocation opportunities for residential properties at the 2012 flood level of 80.25m, at 1M higher at 81.50m and 2 m higher at 82.50m." (Government of New Brunswick 2012, p.12)

**Table 3. AHP Problem Formulation with Hierarchy Weights from Pairwise Comparisons**

- Goal: Adaptation Decision Support for Perth-Andover
  - Environmental Pillar (L: .280)
    - Parks/Trails/Community Fields (L: .270)
    - Commercial Areas (L: .381)
    - Residential Areas (L: .349)
  - Economic Pillar (L: .271)
    - Built Environment (L: .460)
      - Commercial Structures (L: .540)
      - Residential Housing (L: .460)
    - Public Works (L: .540)
      - Roads (L: .403)
      - Bridges (L: .278)
      - Sewage (L: .318)
  - Social Pillar (L: .236)
    - Senior Citizens' Infrastructure (L: .330)
    - Youth Infrastructure (L: .250)
    - Household Income (L: .421)
  - Cultural Pillar (L: .212)
    - Historical Sites (L: .307)
    - Churches (L: .289)
    - Schools (L: .405)

Source: Expert Choice (2010)

Figure 2 below provides the impact map for the 82.5m flood scenario. It is the requirement of the decision maker to provide feedback on how these damage measures are comparable in terms of relative significance. For example, with respect to damage estimates to Roads, it is important to know how the Community evaluates the expected impacts of 2.5km of impassible roads (under the 80.25 m flood) versus the 3.6km (81.5 m flood) and the 4.7km (82.5 m flood) of closed roads. The loss of 4.7km of roads is likely to be considered to be more than twice the impact of 2.5km of roads flooded out. The resulting feedback can be expressed as a “utility curve” that captures the risk attitude of the Community decision makers with respect to Road losses (Raiffa 1968).

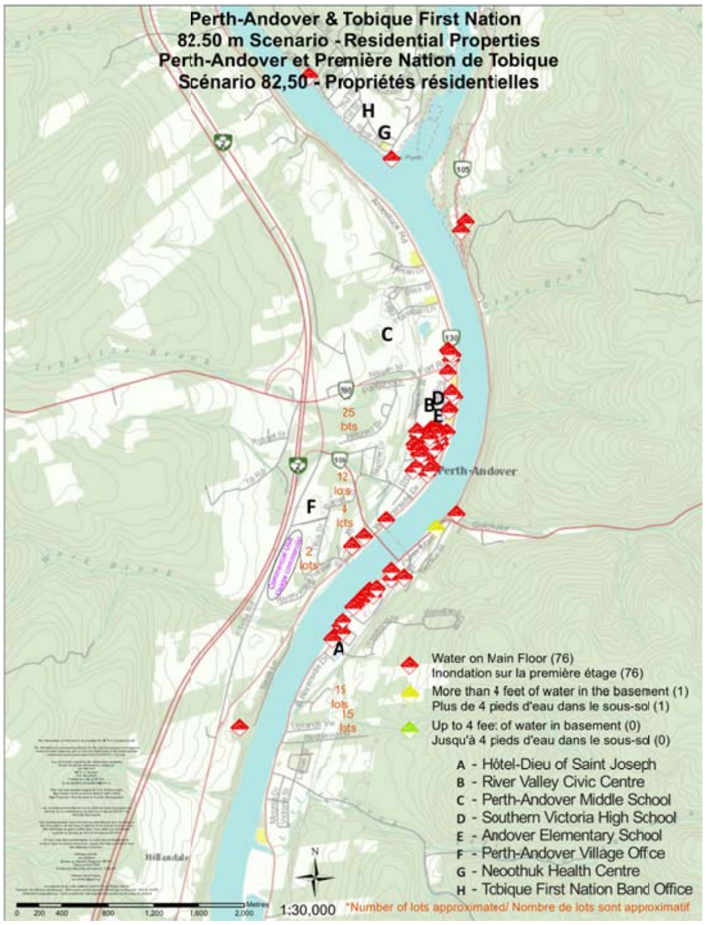



**Figure 2. Perth-Andover Impact Map: 82.5 m Flood Scenario.**
**Source: Government of New Brunswick (2012), Appendix.**

Figure 3 below captures the significance evaluation for the expected damage of Roads for the span of the kilometers from different flood scenarios. This particular curve represents the community decision makers' attitude (measured as "utility" on the arbitrary vertical scale of 0-1) against the impacts of potential road closures that are expected to be between 5km (worst case) or 0km (best case) road closures as a result of the floods (horizontal axis in Figure 3 below).

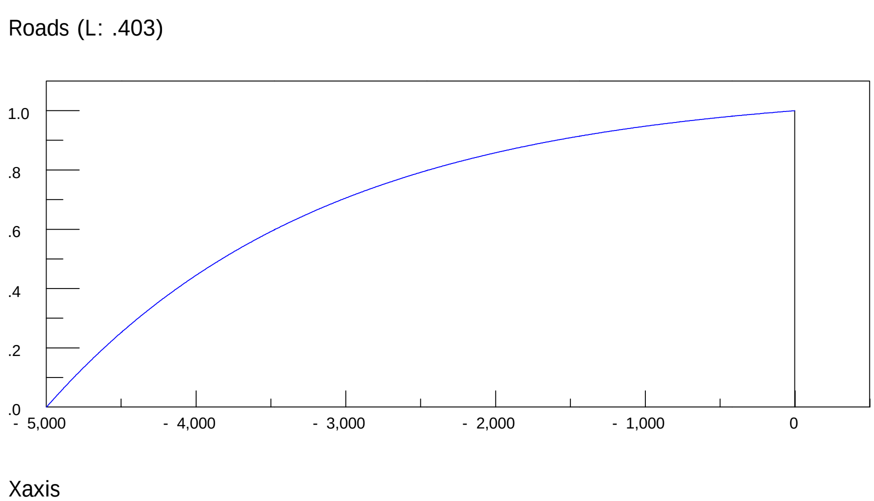



**Figure 3. Community Dimension Utility Curve: Flood induced Road Closures (m)**

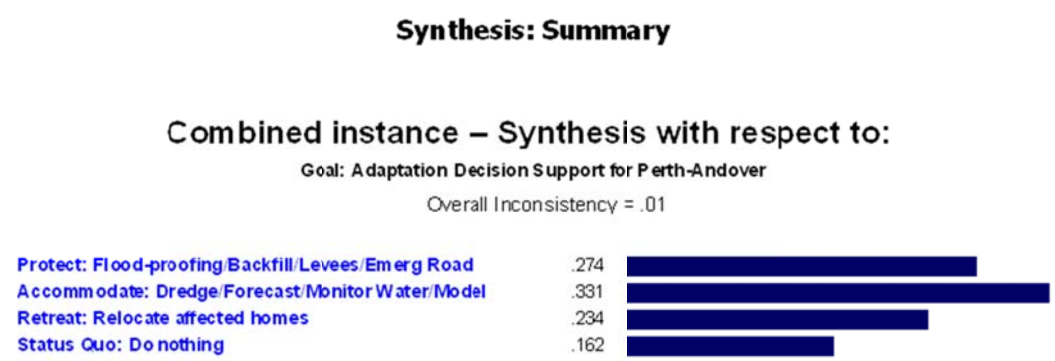
## Alternative Strategies and Environmental Scenarios

In the recent Mitigation Study (Government of New Brunswick 2012), current and deemed 'best practices' for potential adaptation and mitigation measures are explored to the flooding problem in Perth-Andover including investigating the option of relocation. Among the discussion of adaptive alternatives for further evaluation presented in the Report are the following regrouped report recommendations:

1) **Protect –** the protect option is considered to be the most ambitious strategy toward mitigating the flood threat to the community while maintaining, as far as possible, the community Status Quo. This alternative would include the "flood-proofing" low-lying areas, backfill, the levee construction and the Emergency Road.
2) **Accommodate –** this alternative admits to the regular and ongoing occurrence of the spring floods on the Saint John River and is consistent with the idea that the natural process is manageable. The specifics of this strategy include dredging, pier removal, forecast modeling and a developed system of water and ice monitoring.
3) **Retreat –** this strategy would engage in relocating low-lying facilities (commercial property, residential houses, and schools).
4) **Status Quo (do nothing) –** this strategy, or non-strategy, nevertheless represents a decision option. It reflects inaction in the face of the pending flood event.

The expected damages attributed to these adaptive strategies are "scored" relative to the risk attitude values, e.g., Figure 3, applied to each of the Community Profile elements of the Table 3 problem hierarchy. The results of the ranking of the flood response strategies for Perth-Andover are provided in Table 4 below.

**Table 4. Ranked Case Study Results of the Perth-Andover Flood Response Scenarios**




Source: Expert Choice (2010)

The above results summarize those of the original case study presented at the Community of Practice meetings in Ottawa. The sections below present the inputs and associated revised results of the related case study exercises for each of the C-Change Community Partners who participated in the case study exercises of October 27, 2012 during the Community of Practice meetings in Ottawa.

## Community Partner Inputs

The following comparative results are presented for the C-Change Community Partners in Canada and the Caribbean who were present at the Community of Practice meetings, October 26-29, 2012 in Ottawa and contributed to the case study inputs. The results present, for each C-Change Community

Partner, (I) the Community Profile priorities; and (II) the ranking of the adaptation strategy are presented below for each member based on their inputs. The inputs from each partner were determined from the 2-stage exercise that was conducted during the case study presentation. The input forms are provided in the separate (Word format) documents provided for: (I) Perth-Andover Pairwise Comparison Exercise; and (II) Perth-Andover Utility Exercise. The inputs provided by each C-Change Partner are recast, as required for analysis, and discussed in more detail below for the Caribbean (I.2) and the Canadian (I.3) partners.

### I.2. Caribbean Partners Evaluation of Community Profile Dimension Priorities

The Caribbean Community Partners participating in the Community of Practice meeting and contributing case study inputs are as follows:

| No. | Community | Affiliation |
|---|---|---|
| P2 | Georgetown | Guyana Housing Authority |
| P3 | Representing Belize, San Pedro, Ambergris Caye | C-Change Co-researcher |
| P4 | Bequia | Officer |
| P5 | Grande Riviere, T&T | Community representative |

*P2. Georgetown Partner.* The inputs provided were recast and resulted in the Table 5.P2 values below that suggest a superior evaluation of the Economic dimension (positive row values dominating against all other dimensions). Based on these inputs, the Cultural dimension has lowest evaluation against all other dimensions (all positive column values).

**Table 5.P2. Pairwise Comparison Matrix for all Sustainability Dimensions for P2**

| | Economic | Social | Cultural |
|---|---|---|---|
| Environmental | 1.0 | 1.0 | 1.5 |
| Economic | - | 1.5 | 4.0 |
| Social | - | - | 4.0 |

The weighted and scaled comparison of the dimensions from the above pairwise relative comparison values yields overall weights (totaling 1) for the Community Profile dimensions as noted below in Table 6.P2. The weights of Table 6.P2 reflect the pairwise comparison values of Table 5.P2 with the Economic Pillar dominating (weight of 0.353) followed by Social (0.290) and Environmental (0.253). The AHP measure of inconsistency, the Consistency Index, CI=0.05, which is considered acceptable.

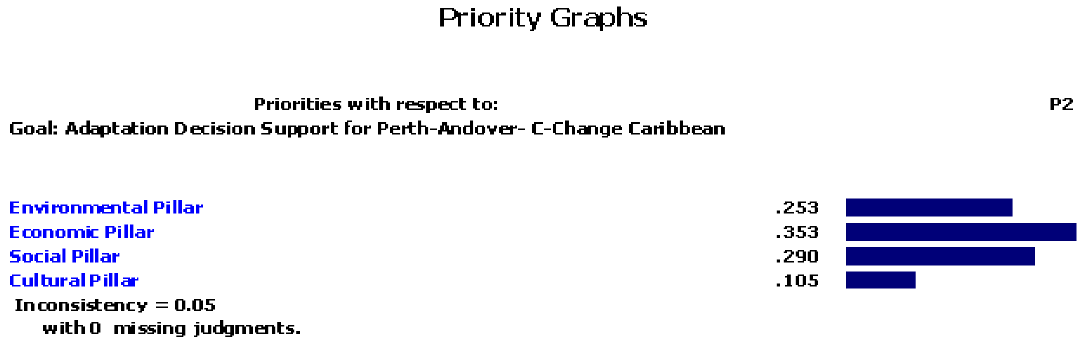



**Table 6.P2. Community Profile Priority Weights for P2 (Expert Choice 2010)**

*P3. Belize Partner.* The inputs of Table 5.P3 for this partner suggest superiority of the Environmental and the Economic dimensions (positive row values dominating against all other dimensions). The Social dimension has improved scores compared to the Cultural dimension indicating higher priority for Social over Cultural.

**Table 5.P3. Pairwise Comparison Matrix for all Sustainability Dimensions for P3**

| | Economic | Social | Cultural |
|---|---|---|---|
| Environmental | 1.0 | 4.0 | 4.0 |
| Economic | - | 2.33 | 9.0 |
| Social | - | - | 1.0* |

*This value was adjusted by the author in order to avoid high CI indicating inconsistency.

The weighted and scaled comparison of the dimensions from the above pairwise relative comparison values yields overall weights for the Community Profile dimensions as in Table 6.P3 below. The weights of Table 6.P3 reflect the pairwise comparison values of Table 5.P3 above with high weights for Economic (0.429) and Environmental (0.378) pillars, and low weights for the Social (0.113) and Cultural (0.80) pillars. The AHP measure of inconsistency, the Consistency Index, CI=0.07 which, being less than 0.10 is considered acceptable.

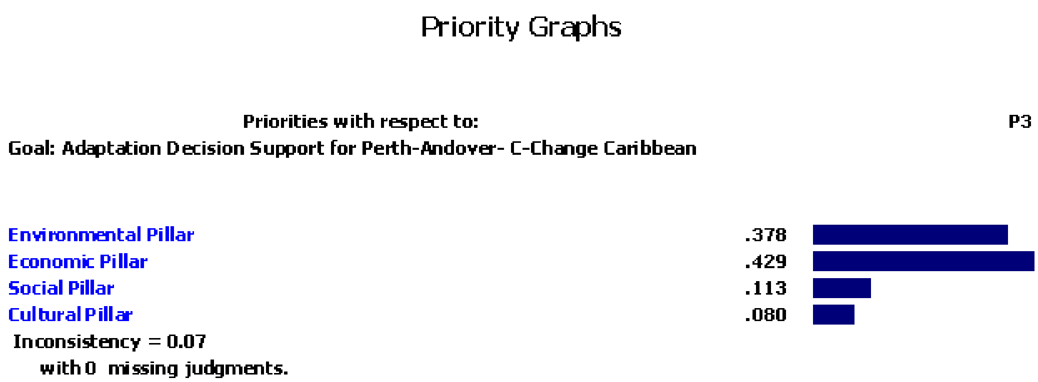



**Table 6.P3. Community Profile Priority Weights for P3 (Expert Choice 2010)**

*P4. Bequia Partner.* The inputs of Table 5.P4 below suggest a close alignment of the priorities along each dimension, i.e., all comparative values are close to “1” (or “equivalence”). The Environmental, Economic, and Social dimensions of the community are indicated to be of the same relative importance in the community profile. The only weakly dominated profile dimension is that of the Cultural dimension in this case with all column values exceeding 1 and indicating relative preference for Cultural opposing pillar.

**Table 5.P4. Pairwise Comparison Matrix for all Sustainability Dimensions for P4**

| | Economic | Social | Cultural |
|---|---|---|---|
| Environmental | 1.0 | 1.0 | 1.5 |
| Economic | - | 1.0 | 1.5 |
| Social | - | - | 1.5 |

The weighted and scaled comparison of the dimensions from the above pairwise relative comparison values yields overall weights for the Community Profile dimensions as provided below in Table 6.P4. The weights of Table 6.P4 reflect the pairwise comparison values of Table 5.P4 with all equal weights for the Economic, Environmental, and the Social pillars (weights of 0.273) and a lower weighted Cultural pillar (0.182). The AHP measure of inconsistency, the Consistency Index, CI=0.05 which is acceptable.

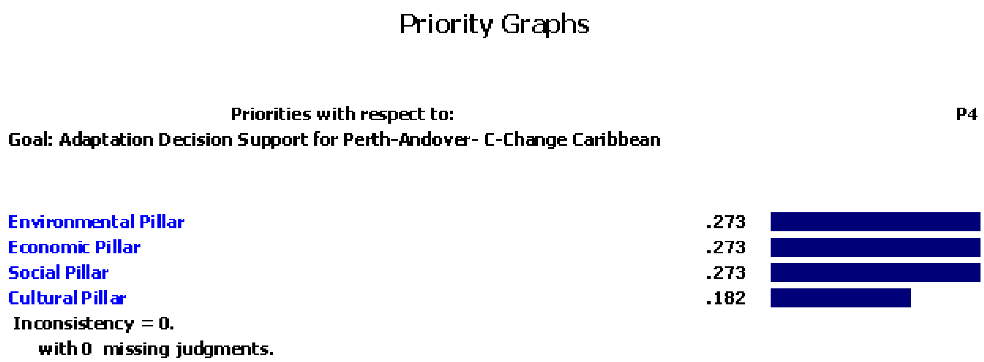



**Table 6.P4. Community Profile Priority Weights for P4 (Expert Choice 2010)**

*P5. Grande Riviere Partner.* The inputs of Table 5.P5 below also suggest a relatively close alignment with slight domination of the Social pillar. The Social dimension is followed closely by the Environmental and then the Economic dimensions of the community profile. The Cultural dimension (all positive column values) is a slightly dominated community profile dimension in this case.

**Table 5.P5. Pairwise Comparison Matrix for all Sustainability Dimensions for P5**

| | Economic | Social | Cultural |
|---|---|---|---|
| Environmental | 2.33 | -1.5 | 1.0 |
| Economic | - | -1.5 | 4.0 |
| Social | - | - | 1.5 |

The weighted and scaled comparison of the dimensions from the above pairwise relative comparison values yields overall weights for the Community Profile dimensions in Table 6.P5 below. The Social pillar (0.300) only slightly exceeds that of the Environmental (0.279) and the Economic pillars (o.267). The weights of Table 6.P5 reflect the pairwise comparison values of Table 5.P5. The AHP measure of inconsistency, the Consistency Index, CI=0.05 which is acceptable.

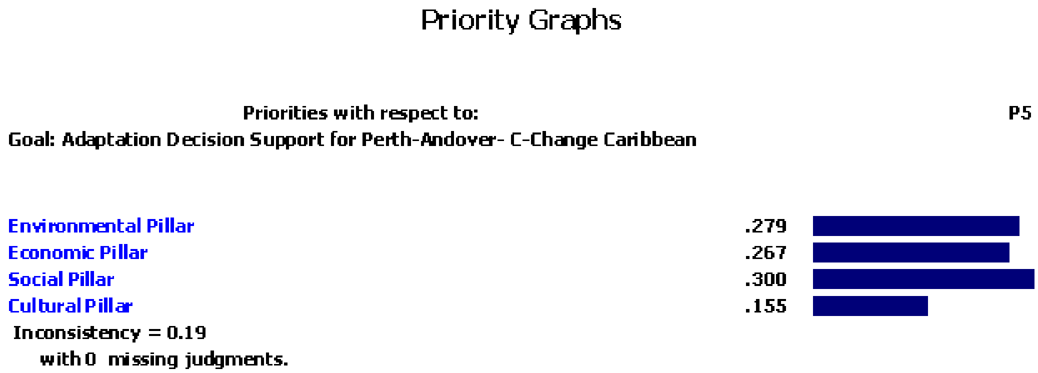



**Table 6.P5. Community Profile Priority Weights for P5 (Expert Choice 2010)**

**Caribbean Partners Comparison of Community Profile Dimension Priorities**

Figure 4 below summarizes the Community Profile results for the Caribbean Community Partners P2 through P5, and compares them to the group's overall average and that of the original Case Study. Among the Partners, these results demonstrate a range of values denoting different emphasis as reported individually above. By comparison, it is noted that the range of differences among the Community Profile dimensions is largest for the Social dimension (range among Partners of 0.187 on a minimum of 0.113 (P3) and a maximum of 0.3 (P5)) and smallest for the smaller weighted Cultural dimension (range among Partners of 0.102 on a minimum of 0.08 (P3) and a maximum of 0.102 (P5)). The maximum weight for the Social and Cultural dimensions among the Caribbean Partners (0.3 (P5)) is slightly above the minimum weights for either the Environmental (0.253 (P2)) or the Economic dimensions (0.267 (P5)). This indicates the Caribbean Partners' strictly higher relative importance assigned to each of the Environmental and Economic dimensions that is on average nearly two-thirds or 67% of total weight versus average approximate weighting for the combined Social and Cultural dimensions of just over one-third or 33% of total weight. In ranked order, average priority weights by dimension for the 4 Caribbean Partners are:

| Priority Ranking | Dimension | Average Priority Weight |
|---|---|---|
| 1 | Economic | 33% |
| 2 | Environmental | 30% |
| 3 | Social | 24% |
| 4 | Cultural | 13% |

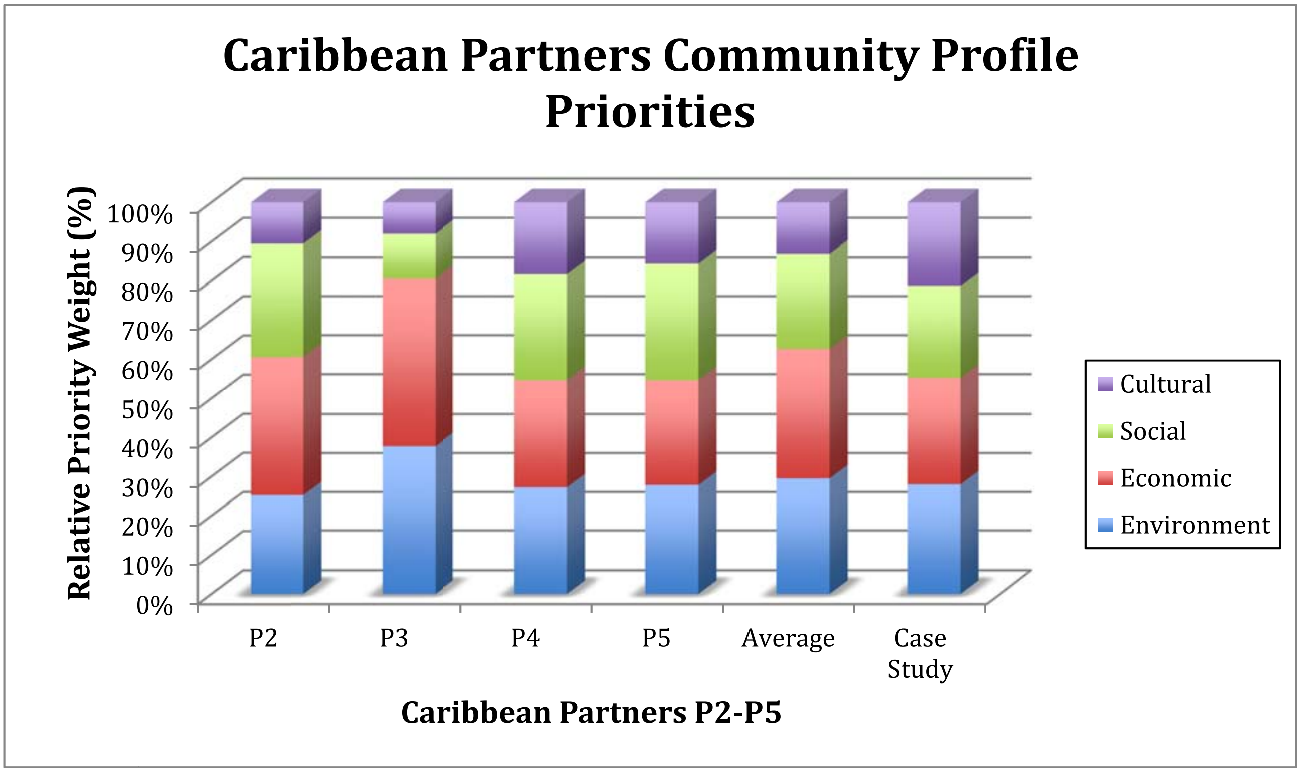



**Figure 4. Caribbean Partners Community Profile Priorities**

## I.3. Canada Partners Evaluation of Community Profile Dimension Priorities

The Canada Community Partners participating in the Community of Practice meeting and contributing case study inputs are noted in the table below:

| No. | Community | Affiliation |
|---|---|---|
| P2 | Iqaluit, NT | Nunavut Climate Change |
| P3 | Isle Madame, NS | Municipality of the County of Richmond |
| P4 | Gibsons, BC | Town Planner |
| P5 | Charlottetown, PEI | City Planning |

The inputs and results for each of the Canadian partners' exercises are discussed in further detail below.

*P2. Iqaluit Partner*. The inputs of Table 7.P2 suggest a superior evaluation of the Cultural dimension (negative Cultural column values dominating against all other dimensions in terms of relative importance), followed by secondary domination of the Social dimension (also negative column values). The Economic dimension has lower evaluation against all other dimensions (negative row values).

**Table 7.P2. Pairwise Comparison Matrix for all Sustainability Dimensions for P2**

| | Economic | Social | Cultural |
|---|---|---|---|
| Environmental | 2.33 | -1.5 | -2.33 |
| Economic | - | -1.5 | -1.5 |
| Social | - | - | 1.0 |

The weighted and scaled comparison of the dimensions from the above pairwise relative comparison values yields overall weights for the Community Profile dimensions are shown in Table 8.P2 below. The weights of Table 8.P2 reflect the pairwise comparison values of Table 7.P2 whereby the Cultural pillar dominatess (weight of 0.331), followed closely by the Social pillar (0.286). The Economic pillar (lowest weight of 0.160) is thereby judged to be least important pillar for Canadian partner P2. The AHP measure of inconsistency, the Consistency Index, CI=0.06, which is considered acceptable.

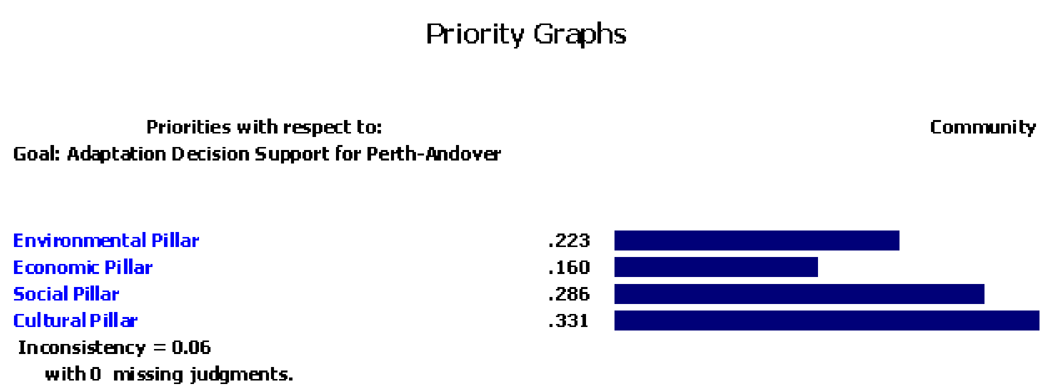



**Table 8.P2. Community Profile Priority Weights for P2 (Expert Choice 2010)**

*P3. Isle Madame Partner*. The inputs of Table 7.P3 suggest a superior evaluation of the Social dimension (negative column value and positive row value, dominating against all other dimensions). The dominance of the Social dimension is followed closely by similar values for the Economic and then the Cultural dimensions. The Environmental dimension is evaluated lower against all other dimensions (as evidenced by the negative row values).

**Table 7.P3. Pairwise Comparison Matrix for all Sustainability Dimensions for P3**

| | Economic | Social | Cultural |
|---|---|---|---|
| Environmental | -2.33 | -2.33 | -2.33 |
| Economic | - | 1.0 | 1.0 |
| Social | - | - | 1.5 |

The weighted and scaled comparison of the dimensions from the above pairwise relative comparison values yields overall weights for the Community Profile dimensions as in Table 8.P3 below. The weights of Table 8.P3 reflect the pairwise comparison values of Table 7.P3 and produce the largest weight for the Social pillar (0.322) followed closely by the Economic pillar (0.290). The Environmental pillar attains the lowest overall importance weighting (0.124). The AHP measure of inconsistency, the Consistency Index, CI=0.0816, which is considered acceptable.

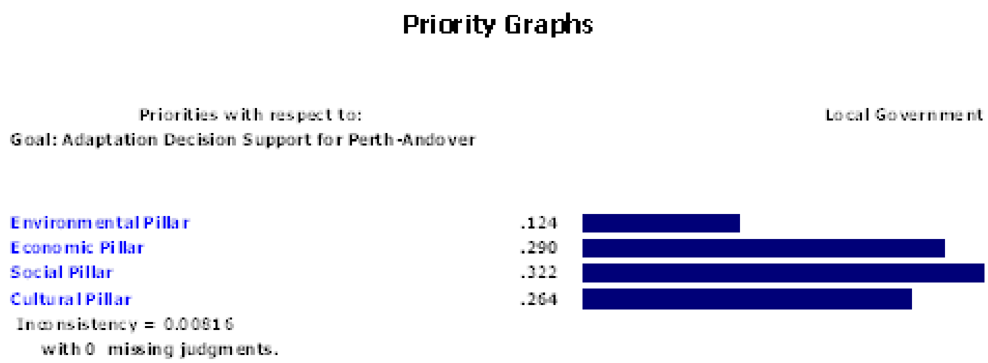



**Table 8.P3. Community Profile Priority Weights for P3 (Expert Choice 2010)**

*P4. Gibsons Partner*. The inputs of Table 7.P4 suggest a superior evaluation of the Economic dimension (high positive row values dominating against all other dimensions), followed by similar domination of the Environmental dimension. The Cultural dimension has lower evaluation (positive column values) against all other dimensions.

**Table 7.P4. Pairwise Comparison Matrix for all Sustainability Dimensions for P4**

| | Economic | Social | Cultural |
|---|---|---|---|
| Environmental | 1.0 | 1.85 | 3.0 |
| Economic | - | 3.0 | 3.0 |
| Social | - | - | 3.0 |

The weighted and scaled comparison of the dimensions from the above pairwise relative comparison values yields the following overall weights for the Community Profile dimensions. The weights of Table 8.P4 reflect the pairwise comparison values of Table 7.P4 with dominant weighting of the Economic pillar (0.383) followed by high rating of the Environmental pillar (0.329). The Social and

Cultural pillars have low relative weights of 0.191 and 0.097 respectively.The AHP measure of inconsistency, the Consistency Index, CI=0.04, which is considered acceptable.

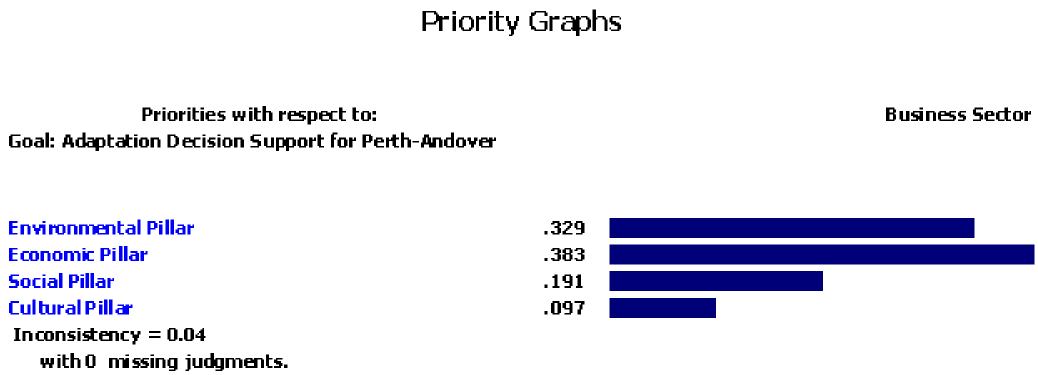



**Table 8.P4. Community Profile Priority Weights for P4 (Expert Choice 2010)**

*P5. Charlottetown Partner.* The inputs of Table 7.P5 for this Canadian partner suggest a superior evaluation of the Social dimension (indicated by negative column values). The Cultural dimension has lower evaluation against all other dimensions (positive column values).

**Table 7.P5. Pairwise Comparison Matrix for all Sustainability Dimensions for P5**

| | Economic | Social | Cultural |
|---|---|---|---|
| Environmental | -2.33 | -2.33 | 1.5 |
| Economic | - | -2.33 | 2.33 |
| Social | - | - | 2.33 |

The weighted and scaled comparison of the dimensions from the above pairwise relative comparison values yields overall weights for the Community Profile dimensions as shown in Table 8.P5 below. The weights of Table 8.P5 reflect the pairwise comparison values of Table 7.P5 with highest Social pillar weighting (0.428) and low relative weights for each of the Environmental (0.161) and the Cultural (0.132) pillars. The AHP measure of inconsistency, the Consistency Index, CI=0.04, which is considered acceptable.

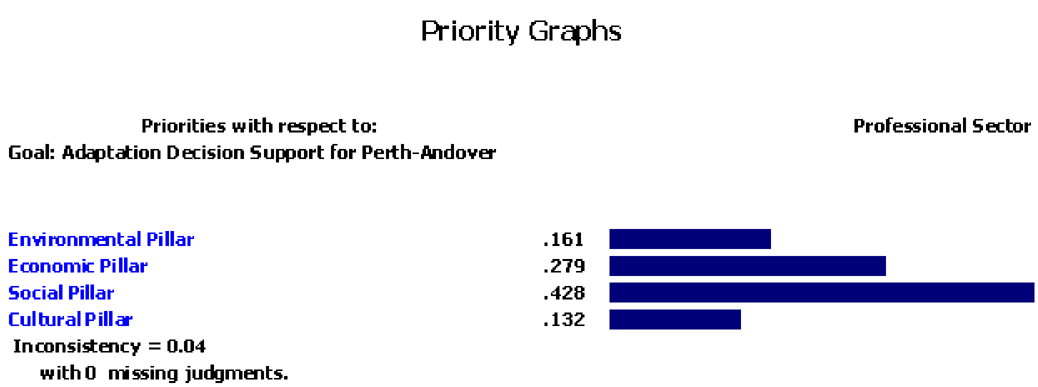



**Table 8.P5. Community Profile Priority Weights for P5 (Expert Choice 2010)**

**Canada Partners Comparison of Community Profile Dimension Priorities**

Figure 5 below summarizes the Community Profile results for the Canadian Community Partners and compares them to the group's overall average and that of the original Case Study. Among the Canadian Partners, the results demonstrate a range of community priorities denoting different emphasis as reported individually above. The range of differences among the Community Profile dimensions is roughly equivalent for all 4 dimensions with largest range for the Social dimension (range among Partners of 0.237 on a minimum of 0.11 (P4) and a maximum of 0.428 (P5)), and smallest range for the Environmental dimension (range among Partners of 0.205 on a minimum of 0.124 (P3) and a maximum of 0.329 (P4)). The smallest priority weight among all Canadian Partners is for the Cultural dimension (0.097 (P4)), while the largest single weight is for the Environmental dimension (0.428 (P5)). Overall, the Canadian Partners' priority weights average out to at least 20% of weight assigned to the lowest priority dimension (Cultural), and just over 30% of weight assigned to the highest priority dimension (Social). Given the variability among the Canadian Partners, these results suggest a relative balance among priorities by dimension. In ranked order, priority weights by dimension for the 4 Canadian Partners are:

| Priority Ranking | Dimension | Average Priority Weight |
|---|---|---|
| 1 | Social | 31% |
| 2 | Economic | 28% |
| 3 | Environmental | 21% |
| 4 | Cultural | 20% |

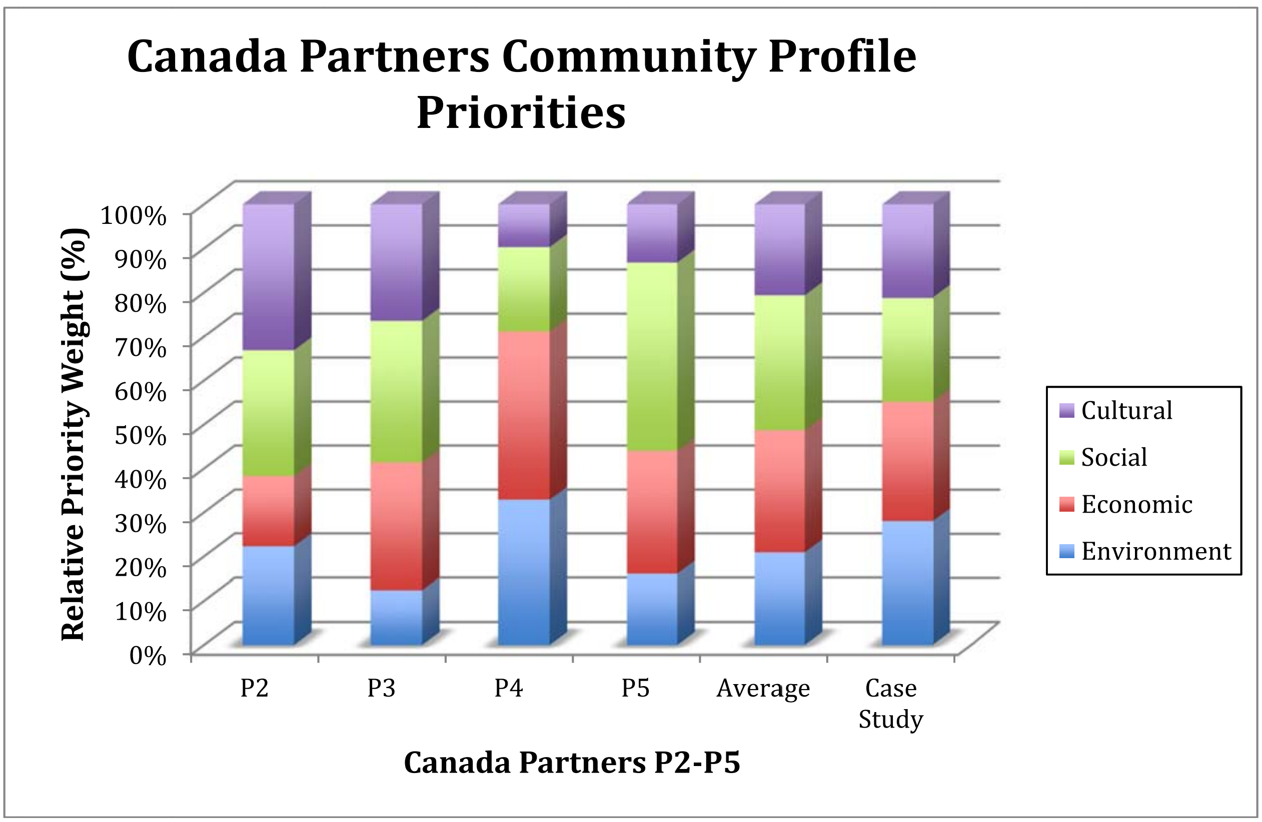



**Figure 5. Canadian Partners Community Profile Priorities**

**All Partners Comparison of Community Profile Dimension Priorities**

The comparison of the Caribbean and the Canadian Partners community profile dimension priorities are presented in Figure 6 below. By comparison, the priorities of the Caribbean Partners weight the Environmental dimension more heavily than the Canadian Partners (30% versus 21%), whereas the Canadian Partners place a higher priority on the Cultural dimension than the Caribbean Partners (21% versus 13%). Similarly, there is a shift in emphasis in priority for Economic versus Social. On average, the Caribbean Partners place more weight on the Economic dimension than the Canadian Partners (33% versus 28%) and similarly, less weight on the Social dimension (24% versus 31%). Overall, the average results tend to flatten out these differences into a more equally weighted priority set across the dimensions. In ranked order, priority weights by dimension for all 8 C-Change Partners representing Canada and the Caribbean region are:

| Priority Ranking | Dimension | Overall Average Priority Weight |
|---|---|---|
| 1 | Economic | 30% |
| 2 | Social | 28% |
| 3 | Environmental | 25% |
| 4 | Cultural | 17% |

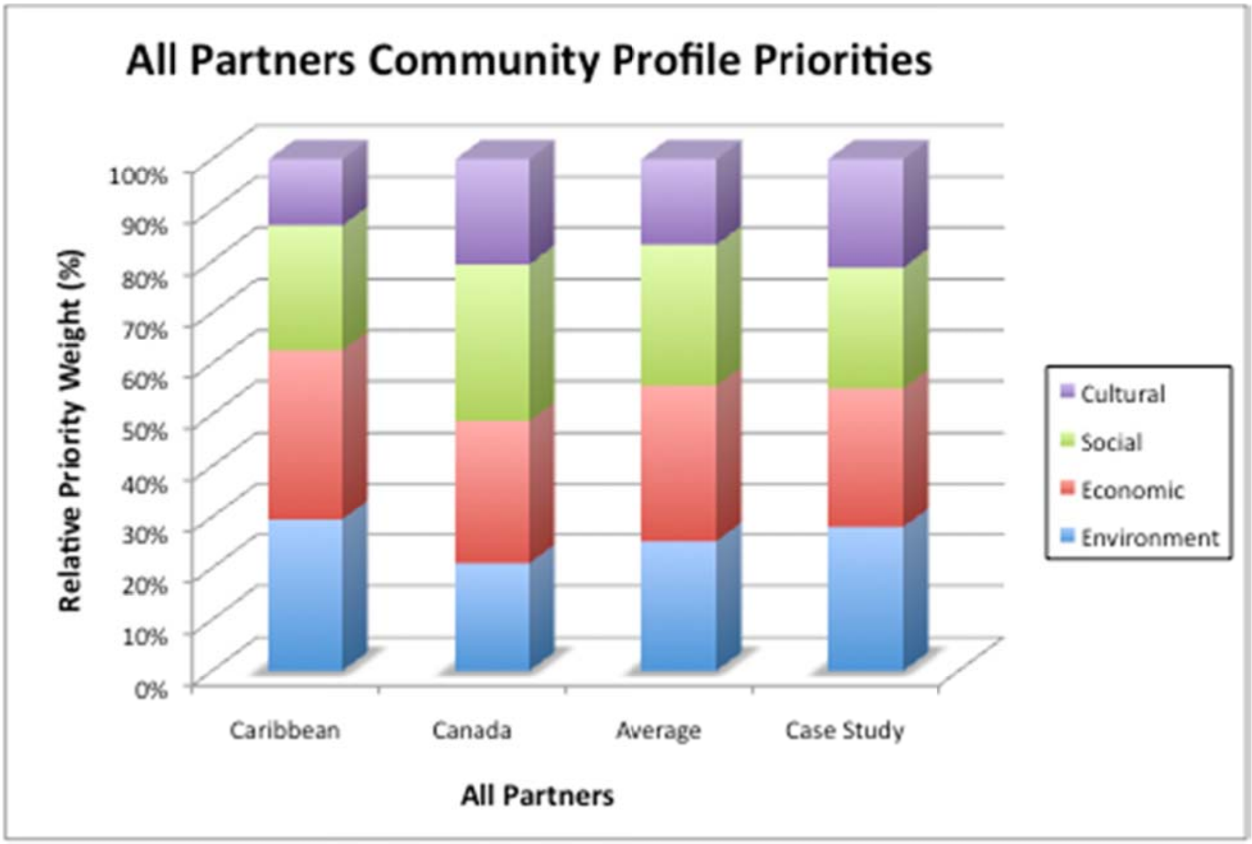



**Figure 6. All Partners Community Profile Priorities**

**Utility Measures Partners' Inputs**

The following results present, for each C-Change Community Partner, the (II) Perth-Andover Utility Exercise inputs for subjective feedback on the impact of flood damage for Perth-Andover indicators. This includes collected information on the impact of flood damage on: (a) park areas (environmental); (b) roads (economic); (c) seniors' infrastructure (social); and (d) schools (cultural). This information was provided as partners' input in the form of utility functions used in the evaluation of flood scenario expected impacts and community priorities for the community dimensions. The following sections of this report illustrate the feedback in utility inputs for Road closures only impacts provided by the C-Change Community Partners. (Other partners' inputs are provided under separate cover.)

**II.2. Caribbean Utility Measures for Damage Scenarios**

The Caribbean participants completed 4 utility functions for the utility data grid of the AHP hierarchy. These data were compiled for the following damage impact indicators (one indicator per dimension of the Community Profile):

1. Parks/Trails/Community Fields (Environmental Pillar)
2. Public Works – Roads closure (Economic Pillar)
3. Seniors' Infrastructure (Social Pillar)
4. Schools Flooded (Cultural Pillar)

The figures Figure 7.P2 through 7.P5 below captures the feedback for item 2, Roads closure damage impacts only, as input provided by each of the Caribbean partners. (A complete set of comparable values for all items 1-4 above are provided for each C-Change Community Partner, under separate cover.) These comparisons are provided in this report to note similarities and differences between all utility inputs (items 1-4 above) among partners, and for direct comparison to the Roads closure utility function used in the original Case Study data as shown in Figure 3 above.

Correspondingly, Tables 9.P2 through 9.P5 provide the results of the respective Caribbean partners' rankings of the Perth-Andover Adaptation Strategies. These results are the final outcome of the Case Study corresponding to the complete set of Caribbean partners' inputs for (I) Community Profile priorities, and (II) the suite of 4 utility functions noted above. These ranked adaptation strategies results for the partners take into account the partners' priorities (Tables 6.P2-6.P5 (Caribbean partners) and 8.P2-8.P5 (Canadian partners) above) and the partners' utility inputs (Figures 7.P2-P5-Caribbean partners, and Tables 9.P2-P5-Canadian partners below). These rankings are directly comparable to the Case Study final rankings reported in Table 4 above for the original case results.

*P2. Georgetown Partner.* The inputs for this Caribbean partner for Road closure damage impact utility are provided in graphic form and presented in the Figure 7.P2 utility function below. Based on these graphical inputs, Road closures are notably more risk averse, i.e., more convex, than the original case study utility function of Figure 3 above. This implies that the partner's valuation of Road closure damage impacts are higher than would be considered as 'risk neutral', or marginally equal, from the highest road closure estimate of 5km position (at the lowest utility valuation of 0), to the lowest road closure impacts of 0km (at the highest utility valuation of 1). In this case, the partner is relatively tolerant of road closures of up to 3km, but values more closures beyond 3km much less and at an increasing rate of valuation (utility) decline. As such, Figure 7.P2 below illustrates a marginally decreasing rate of improved utility as road closures diminish. In other words, it is of interest in this case to avoid high levels (greater than 3km) of road closures.

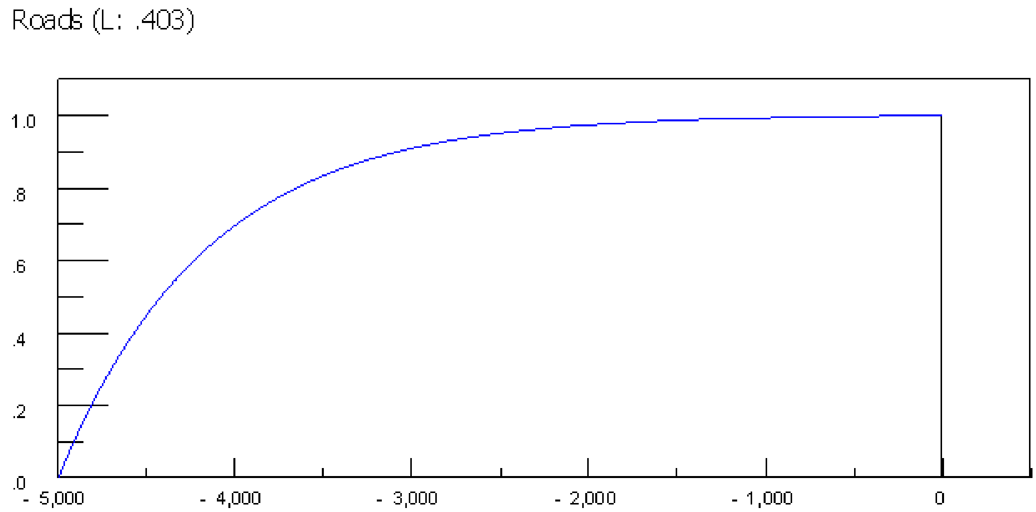



**Figure 7.P2. Utility Curve: Flood induced Road Closures (m) for P2**

The application of the Road closures utility function of Figure 7.P2, with the partner-provided inputs for other items 1-4 above, were used, together with the partner's indicated Community Profile priorities of Table 6.P2, to determine the ranked preferences for the selected alternative adaptation strategies in the case of the Perth-Andover flooding scenarios. The results of these rankings are provided in Table 9.P2 below. As indicated in the weights and gray bars of Table 9.P2 below, the preferred adaptation strategy for Caribbean Partner P2 is the "Accommodate" strategy. This strategy (ranking weight: 0.326) dominates the suite of alternative options and therefore provides the basis for logical support of this strategy for the partner P2. As such, the difference between the second ranked strategy "Protect" (ranking weight: 0.285) and review of the model inputs, as well as an analysis of the sensitivity of these results may more or less differentiate between the "Accommodate" and the "Protect" options in this case. It can be stated that, given the lower rates, the "Retreat" option (ranking weight: 0.226) is considered by P2 as a lower weighted "last resort" strategy compared to Accommodate and Protect.

It is also clear from these results that the "Status Quo/Do Nothing" option (ranking weight: 0.163) is distinctly different from all other adaptive strategy actions. It is not unexpected that "Do Nothing" – as a strategy in itself - is indicated by the Caribbean Partner P2 as an ineffective strategy adaptation in this case.

**Alternatives**

| | |
|---|---|
| **Protect: Flood-proofing/Backfill/Levees/Emerg Road** | **.285** |
| **Accommodate: Dredge/Forecast/Monitor Water/Model** | **.326** |
| **Retreat: Relocate affected homes** | **.226** |
| **Status Quo: Do nothing** | **.163** |

**Table 9.P2. Final Adaptation Strategies Ranking for P2**

*P3. Belize Partner.* The inputs for the Road closure damage impact utility are provided in graphic form and presented in the Figure 7.P3 utility function below. Based on these graphical inputs, Road closures are defined to be "risk neutral", i.e., the loss of an additional 1km of roads to closure is equally valued by the decision maker for all closures. In other words, the loss of the first kilometre of roads closed from 0km (no roads closed) to 1km, is valued the same as the loss of the fifth km from 4km to 5km. This implies that the partner's valuation of marginal Road closure damage are equal in the domain of closures up to 5km. Figure 7.P3 below illustrates a straight line or marginally equal rate of improved utility as road closures diminish. In other words, the additional loss of roads to closure due to the flooding is seen as being the same.

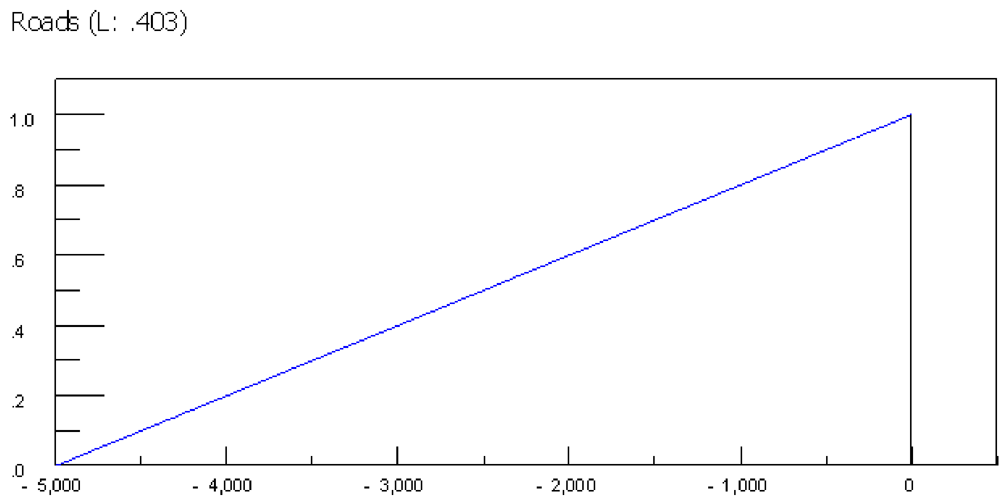



**Figure 7.P3. Utility Curve: Flood induced Road Closures (m) for P3**

The application of the Road closures utility function of Figure 7.P3 together with the partner-provided inputs for other items 1-4 above, were used, together with the partner's indicated Community Profile priorities of Table 6.P3 above, to determine the ranked preferences for the selected alternative adaptation strategies in the case of the Perth-Andover flooding scenarios. The results of these rankings are provided in Table 9.P3 below. Table 9.P3 indicates that the preferred adaptation strategy for Caribbean Partner P3 is the "Accommodate" strategy. This strategy (ranking weight: 0.350) dominates the suite of alternative options and therefore provides the basis for logical support of this strategy for the partner P3. In comparison with P2, these results are a stronger reinforcement of the dominant "Accommodate" strategy. At the same time, there is a more significant difference between the second ranked strategy "Protect" (ranking weight: 0.266) and the "Accommodate" option in this case. Also as for P2, the "Retreat" option (ranking weight: 0.238) is a distant third as preferred strategy. Finally, yet again, the "Do Nothing" option (ranking weight: 0.147) is weighted even less by comparison with P2. Further, the "Do Nothing" – as a strategy - is indicated by the Caribbean Partner P3 as a most ineffective adaptation strategy in this case.

**Alternatives**

| | |
|---|---|
| **Protect: Flood-proofing/Backfill/Levees/Emerg Road** | **.266** |
| **Accommodate: Dredge/Forecast/Monitor Water/Model** | **.350** |
| **Retreat: Relocate affected homes** | **.238** |
| **Status Quo: Do nothing** | **.147** |

**Table 9.P3. Final Adaptation Strategies Ranking for P3**

*P4. Bequia Partner.* The inputs for the Road closure damage impact utility are provided in graphic form and presented in the Figure 7.P4 utility function below. Based on these graphical inputs, Road closures are slightly risk averse, i.e., more convex, than the risk neutral case (Figure 7.P3) and similar to the original case study utility function of Figure 3 above. This implies that partner P4's valuation of Road closure damage impacts are slightly higher than would be considered as 'risk neutral', or marginally equal, from the highest road closure estimate of 5km position (at the lowest utility valuation of 0), to the lowest road closure impacts of 0km (at the highest utility valuation of 1). In this case, the partner is relatively tolerant of road closures of up to 3km, but values more closures beyond 3km much less and at an increasing rate of valuation (utility) decline. As such, Figure 7.P4 below illustrates a marginally decreasing rate of improved utility as road closures diminish. In other words, it is of interest in this case to avoid high levels (greater than 3km) of road closures.

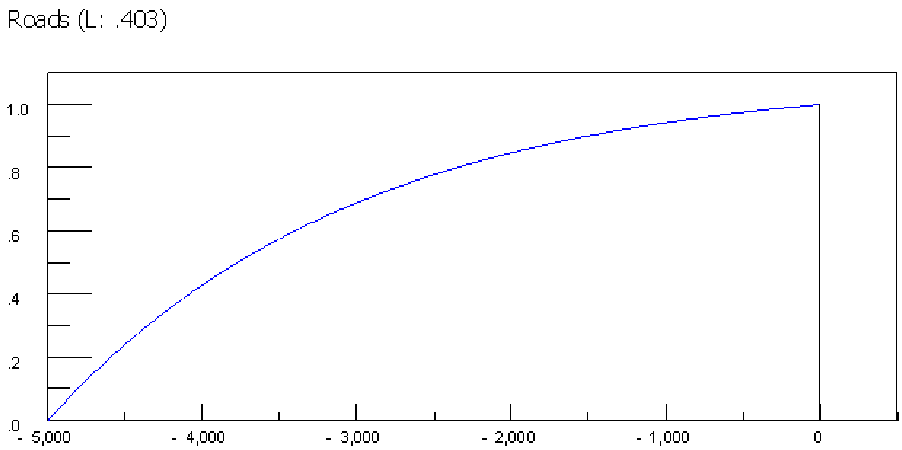



**Figure 7.P4. Utility Curve: Flood induced Road Closures (m) for P4**

The application of the Road closures utility function of Figure 7.P4 together with the partner-provided inputs for other items 1-4 above, were used, together with the partner's indicated Community Profile priorities of Table 6.P4 to determine the ranked preferences for the selected alternative adaptation strategies in the case of the Perth-Andover flooding scenarios. The results of these rankings are provided in Table 9.P4 below. Table 9.P4 indicates that the preferred adaptation strategy for Caribbean Partner P2 is the "Accommodate" strategy. This strategy (ranking weight: 0.338). The "Protect" strategy (ranking weight: 0.274) is significantly different from the preferred strategy for the preference of partner P4. Similarly, the Retreat option (ranking weight: 0.233) ranks third in relative preference. It can be stated that, given the lower weights, that the "Retreat" option is less preferred. Finally, the "Status Quo/Do Nothing" option (ranking weight: 0.154) is again significantly less than the other active adaptation strategies and is not a likely candidate that may be indicated by the structured inputs of the problem as provided by the Caribbean Partner P4.

**Alternatives**

| | |
|---|---|
| **Protect: Flood-proofing/Backfill/Levees/Emerg Road** | **.274** |
| **Accommodate: Dredge/Forecast/Monitor Water/Model** | **.338** |
| **Retreat: Relocate affected homes** | **.233** |
| **Status Quo: Do nothing** | **.154** |

**Table 9.P4. Final Adaptation Strategies Ranking for P4**

*P5. Grande Riviere Partner.* The inputs for the Road closure damage impact utility are provided in graphic form and presented in the Figure 7.P5 utility function below. Like the results above for partner P4, P5's results show slightly risk averse utility, i.e., more convex, than the risk neutral case (Figure 7.P3) and similar to the original case study utility function of Figure 3 above. This implies that partner P5's valuation of Road closure damage impacts are slightly higher than would be considered as 'risk neutral', or marginally equal, from the highest road closure estimate of 5km position (at the lowest utility valuation of 0), to the lowest road closure impacts of 0km (at the highest utility valuation of 1). Figure 7.P5 below illustrates a marginally decreasing rate of improved utility as road closures diminish. In other words, as for partner P4, it is of interest in this case to avoid high levels (greater than 3km) of road closures.

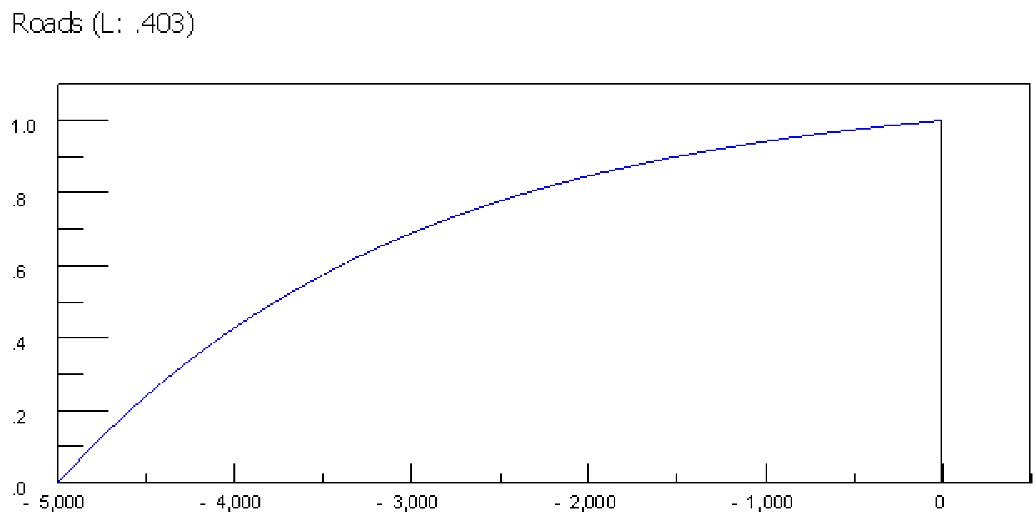



**Figure 7.P5. Utility Curve: Flood induced Road Closures (m) for P5**

The application of the Road closures utility function of Figure 7.P5 together with the partner-provided inputs for other items 1-4 above, were used, together with the partner's indicated Community Profile priorities of Table 6.P5 to determine the ranked preferences for the selected alternative adaptation strategies in the case of the Perth-Andover flooding scenarios. The results of these rankings are provided in Table 9.P5 below. Table 9.P5 indicates strongly that the preferred adaptation strategy for Caribbean Partner P5 is the "Accommodate" strategy. This strategy (ranking weight: 0.336) dominates the suite of alternative options and therefore provides the basis for logical support of this strategy for the partner P5. There is a difference, arguably not significant between the second ranked strategy "Protect" (ranking weight: 0.282) and the "Accommodate" option in this case. It can be stated that, given the lower rate, the "Retreat" option (ranking weight: 0.229) is an unlikely candidate for adaptation.

Finally, as in all cases noted above, and as intuitive, the "Status Quo/Do Nothing" option (ranking weight: 0.153) is not a strategy that should be considered by the structured inputs of the problem as provided by the Caribbean Partner P2.

**Alternatives**

| | |
|---|---|
| Protect: Flood-proofing/Backfill/Levees/Emerg Road | .282 |
| Accommodate: Dredge/Forecast/Monitor Water/Model | .336 |
| Retreat: Relocate affected homes | .229 |
| Status Quo: Do nothing | .153 |

**Table 9.P5. Final Adaptation Strategies Ranking for P5**

**Caribbean Partners Comparison of Community Partners' Adaptive Strategies Ranking**

Figure 8 below summarizes the adaptive strategies ranking results for the Caribbean Community Partners and compares them to the group's overall average and that of the original Case Study. These results demonstrate that there is a general overall preference for the "Accommodate" strategy over the "Protect" strategy in all 4 of the 4 partners' inputs. The Retreat strategy is everywhere ranked as the third most preferable option. In all of these cases, the Status Quo/Do Nothing strategy was regarded as being significantly weaker as an adaptation strategy with low ranking weights. This indicates clearly from the indicated priority weighting and utility inputs that it is always better to act than not to act, i.e., the opportunity cost of not acting, or "doing nothing" is significant for all partners.

These results compare well with the original case study outcomes and are reflected in the group average.

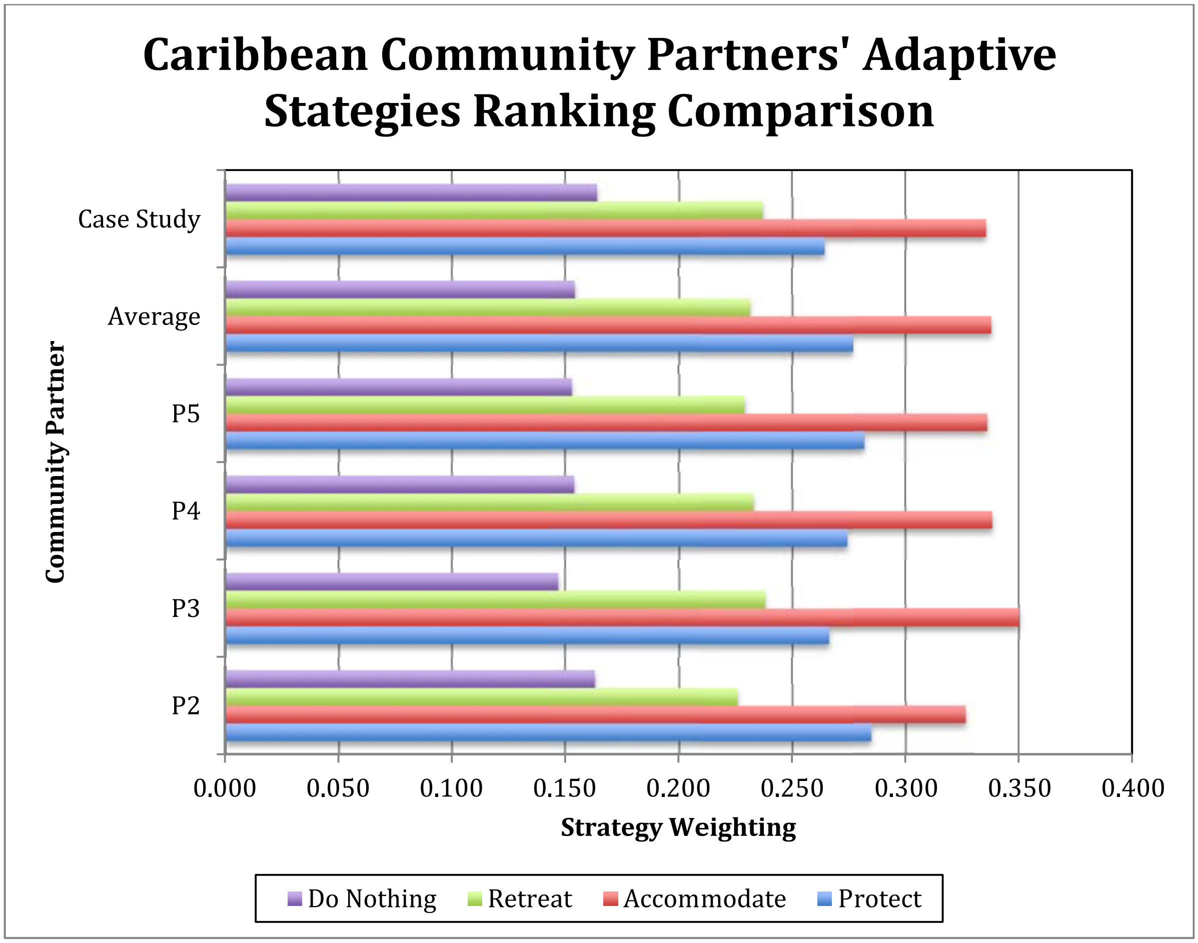



**Figure 8. Caribbean Partners Adaptive Strategies Ranking**

## II.3. Canadian Utility Measures for Damage Scenarios

The Canadian participants also completed the 4 utility functions for the utility data grid of the AHP hierarchy. As for the Caribbean partners described above, these data were compiled for the following damage impact indicators (one indicator per dimension of the Community Profile):

1. Parks/Trails/Community Fields (Environmental Pillar)
2. Public Works – Roads closure (Economic Pillar)
3. Seniors' Infrastructure (Social Pillar)
4. Schools Flooded (Cultural Pillar)

Figures 9.P2 through 9.P5 below captures the feedback for item 2, Roads closure damage impacts only as provided by each of the Canadian partners. (A complete set of comparable values is provided for each C-Change Community Partner, under separate cover.) These comparisons are provided to note similarities and differences between the utility inputs (items 1-4 above) among partners, and for direct comparison to the Roads closure utility function used in the original Case Study data as shown for the original case presentation as in Figure 3 above. Tables 10.P2 through 10.P5 provide the final results of the respective Canadian partners' rankings of the Perth-Andover Adaptation Strategies. These results are the final outcome of the Case Study corresponding to the complete set of Canadian partners' inputs for (i) Community Profile priorities, and (ii) the suite of 4 utility functions including Road closure utilities noted above. These ranked adaptation strategies results for the partners take into account the partners' priorities (Tables 6.P2-6.P5-Caribbbean partners, and 8.P2-8.P5-Canadian partners, above) and the partners' utility inputs (Figures 9.P2-P5-Caribbbean partners and Tables 10.P2-P5-Canadian partners below). These rankings are comparable to the Case Study final rankings of Table 4 above.

*P2. Iqaluit Partner*. The partner's inputs are provided in graphic form and resulted in the Figure 9.P2 utility function below. Based on these graphical inputs, Road closures are highly risk averse, i.e., more convex, than the original case study utility function of Figure 3. This implies that the partner's valuation of Road closure damage impacts are higher than would be considered as 'risk neutral' from the highest road closure estimate of 5km position (at the lowest utility valuation of 0), to the lowest road closure impacts of 0km (at the highest utility valuation of 1). In this case, the partner is relatively tolerant of road closures of up to 4km, but values more closures beyond 4km much less and at a sharp rate of valuation (utility) decline. Figure 9.P2 below illustrates a marginally decreasing rate of improved utility as road closures diminish. It is of interest for this partner to avoid high levels (greater than 4km) of road closures.

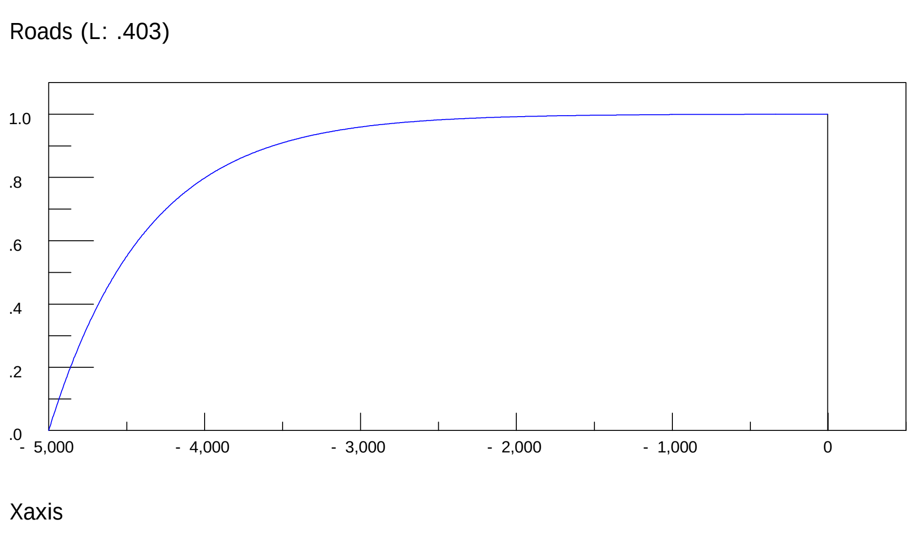



**Figure 9.P2. Utility Curve: Flood induced Road Closures (m) for P2**

The application of the Road closures utility function of Figure 9.P2, the partner-provided inputs for other items 1-4 above, together with the partner's indicated Community Profile priorities of Table 6.P2, determine the ranked preferences for the selected alternative adaptation strategies in the case of the Perth-Andover flooding scenarios. The results of these rankings are provided in Table 10.P2 below. As indicated in the weights and gray bars of Table 10.P2 below, the dominant preferred adaptation strategy for Canadian Partner P2 is the "Protect" strategy. This strategy (ranking weight: 0.385) dominates the suite of alternative options and therefore provides the basis for logical support of this strategy for the partner P2. The difference between the second ranked strategy "Accommodate" (ranking weight: 0.308) is significant and differentiates between the "Accommodate" and the "Protect" options in this case. Given the lower rates, the "Retreat" option (ranking weight: 0.231) is considered by Canadian partner P2 as a lower weighted "last resort" strategy compared to Accommodate and Protect. It is especially clear from partner P2 results that the "Status Quo/Do Nothing" option (ranking weight: 0.077) is distinctly different – and much less preferred, compared to all other adaptive strategy actions. The "Do Nothing" strategy is indicated by the Canadian Partner P2 as a very ineffective strategy adaptation in this case.

**Alternatives**

| | |
|---|---|
| **Protect: Flood-proofing/Backfill/Levees/Emerg Road** | **.385** |
| **Accommodate: Dredge/Forecast/Monitor Water/Model** | **.308** |
| **Retreat: Relocate affected homes** | **.231** |
| **Status Quo: Do nothing** | **.077** |

**Table 10.P2. Final Adaptation Strategies Ranking for P2**

*P3. Isle Madame Partner*. The inputs provided in graphic form for Canadian partner P3 are illustrated in the Figure 9.P3 utility function below. Based on these graphical inputs, the concave Road closures utility function is considered to exhibit "risk seeking" behavior, i.e., concave, relative to the convex original case study utility function of Figure 3. The partner's valuation of Road closure damage impacts are lower than would be considered as 'risk neutral' from the highest road closure estimate of 5km position (at the lowest utility valuation of 0), to the lowest road closure impacts of 0km (at the highest utility valuation of 1). In this case, the partner P3 is intolerant of road closures of any amount with very low utility assigned to Road closures greater than 1km. Figure 9.P2 below illustrates a marginally increasing rate of improved utility as road closures diminish from 5km to 0km. It is of interest for this partner to avoid all closures.

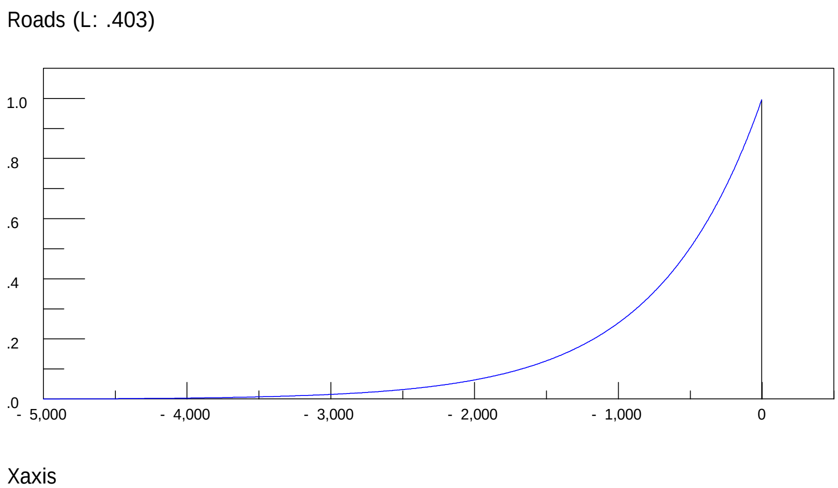



**Figure 9.P3. Utility Curve: Flood induced Road Closures (m) for P3**

The application of the Road closures utility function of Figure 9.P3, the partner-provided inputs for other items 1-4 above, together with the partner's indicated Community Profile priorities of Table 6.P3, determine the ranked preferences for the selected alternative adaptation strategies in the case of the Perth-Andover flooding scenarios. The ranking results are provided in Table 10.P3 below. As indicated in the weights and gray bars of Table 10.P3 below, the dominant preferred adaptation strategy for Canadian Partner P3 is the "Accommodate" strategy. This strategy (ranking weight: 0.306) dominates the suite of alternative options for the partner P3. The difference between the second ranked strategy "Protect" (ranking weight: 0.288) is not significant and differences between the "Accommodate" and the "Protect" options in this case should be further investigated by reviewing al inputs and through a sensitivity analysis. Given the lower rates, the "Retreat" option (ranking weight: 0.240) is considered by Canadian partner P3 as third –best strategy compared to Accommodate and Protect.

Finally, it is very clear from partner P3 results that the "Status Quo/Do Nothing" option (ranking weight: 0.165) is quite different compared to all other adaptive strategy actions. The "Do Nothing" strategy is indicated by the Canadian Partner P3 as a less than effective strategy adaptation in this case.

**Alternatives**

| | |
|---|---|
| **Protect: Flood-proofing/Backfill/Levees/Emerg Road** | **.288** |
| **Accommodate: Dredge/Forecast/Monitor Water/Model** | **.306** |
| **Retreat: Relocate affected homes** | **.240** |
| **Status Quo: Do nothing** | **.165** |

**Table 10.P3. Final Adaptation Strategies Ranking for P3**

*P4. Gibsons Partner.* The inputs provided in graphic form and resulted in the Figure 9.P4 utility function below. Based on these graphical inputs, Road closures are more risk averse, i.e., more convex, than the original case study utility function of Figure 3. The inputs provided in graphic form for Canadian partner P4 are illustrated in the Figure 9.P4 utility function below. Based on these graphical inputs, the concave Road closures utility function are considered to exhibit slightly "risk averse" behavior, i.e., convex, relative to the risk neutral (straight line utility curve) function. Figure 9.P4 and the original case study utility function of Figure 3 compare favorably. In this case, Canadian partner P4's tolerance of road closures declines at a slightly increasing rate as Road closures exceed 3km. Figure 9.P4 below illustrates a marginally decreasing rate of improved utility as road closures diminish from 5km to 0km.This partner would seek to avoid road closures beyond 3km.

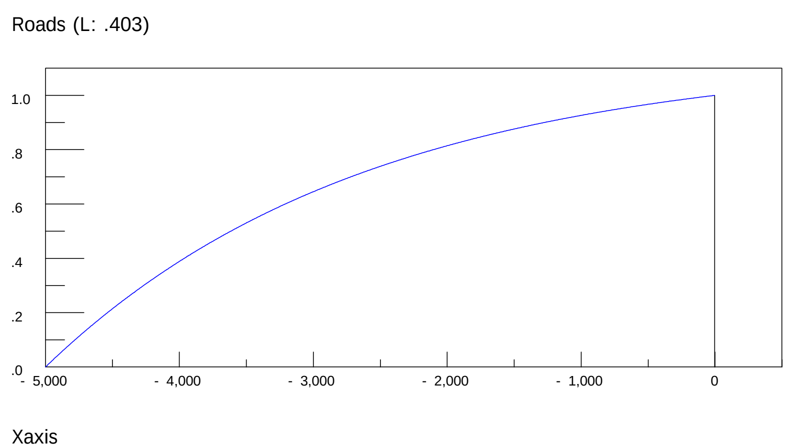



**Figure 9.P4. Utility Curve: Flood induced Road Closures (m) for P4**

The application of the Road closures utility function of Figure 9.P4, the partner-provided inputs for other items 1-4 above, together with the partner's indicated Community Profile priorities of Table 6.P4, determine the ranked preferences for the selected alternative adaptation strategies in the case of the Perth-Andover flooding scenarios. The ranking results are provided in Table 10.P4 below. As indicated in the weights and gray bars of Table 10.P4 below, the dominant preferred adaptation strategy for Canadian Partner P3 is the "Accommodate" strategy. This strategy (ranking weight: 0.356) dominates the suite of alternative options for the partner P4. Further, the difference between the second ranked strategy "Protect" (ranking weight: 0.266) is significant and differences between the "Accommodate" and the "Protect" options in this case are clearly different.

Given the lower rates, the "Retreat" option (ranking weight: 0.229) is considered by Canadian partner P4 as an unattractive third –best strategy compared to Accommodate and Protect. Finally, it is once again very clear from partner P4 results that the "Status Quo/Do Nothing" option (ranking weight: 0.149) is quite different compared to all other adaptive strategy actions. The "Do Nothing" strategy is indicated by the Canadian Partner P4 as a less than effective strategy adaptation in this case.

**Alternatives**

| | |
|---|---|
| **Protect: Flood-proofing/Backfill/Levees/Emerg Road** | **.266** |
| **Accommodate: Dredge/Forecast/Monitor Water/Model** | **.356** |
| **Retreat: Relocate affected homes** | **.229** |
| **Status Quo: Do nothing** | **.149** |

**Table 10.P4. Final Adaptation Strategies Ranking for P4**

*P5. Charlottetown Partner.* The inputs provided in graphic form for Canadian partner P5 are illustrated in the Figure 9.P5 utility function below. Based on these graphical inputs, the concave Road closures utility function is considered to exhibit slightly "risk seeking" behavior, i.e., concave, relative to the convex original case study utility function of Figure 3. In this case, the partner P5 is rather intolerant of road closures more than 1km. Figure 9.P5 below illustrates a marginally increasing rate of improved utility as road closures diminish from 5km to 0km. It is preferred by the partner to avoid road closures beyond 1km.

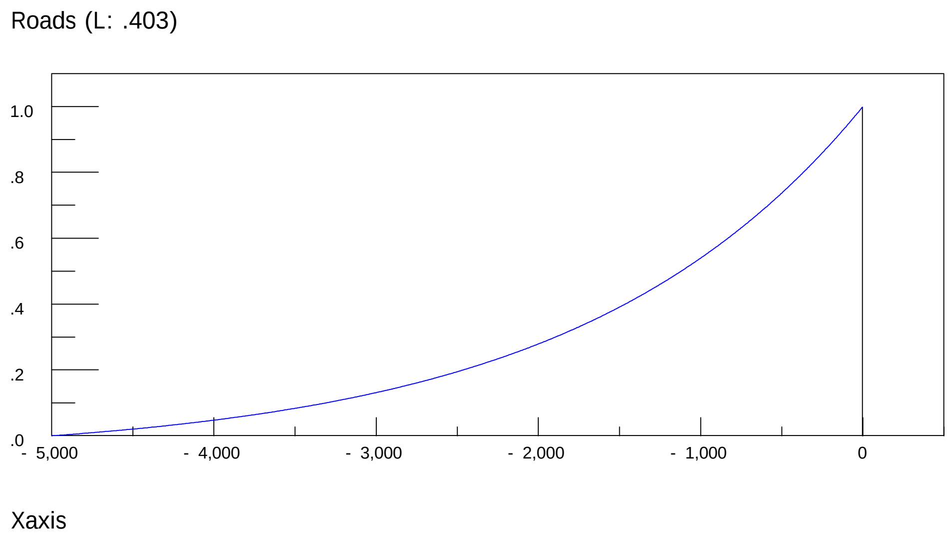



**Figure 9.P5. Utility Curve: Flood induced Road Closures (m) for P5**

The application of the Road closures utility function of Figure 9.P5, the partner-provided inputs for other items 1-4 above, together with the partner's indicated Community Profile priorities of Table 6.P5, determine the ranked preferences for the selected alternative adaptation strategies in the case of the Perth-Andover flooding scenarios. The ranking results are provided in Table 10.P5 below. As indicated in the weights and gray bars of Table 10.P5 below, the dominant preferred adaptation strategy for Canadian Partner P5 is the "Accommodate" strategy. This strategy (ranking weight: 0.319) dominates the suite of alternative options for the Canadian partner P5. The difference between the second ranked strategy "Protect" (ranking weight: 0.297) is not very significant and differences between the "Accommodate" and the "Protect" options in this case should be further investigated, e.g., by reviewing all inputs and through a sensitivity analysis. The "Retreat" option (ranking weight: 0.229) is considered by Canadian partner P5 as third –best strategy compared to Accommodate and Protect.

Finally, it is very clear from partner P5 results that the "Status Quo/Do Nothing" option (ranking weight: 0.155) is quite different compared to all other adaptive strategy actions. The "Do Nothing" strategy is indicated by the Canadian Partner P3 as a less than effective strategy adaptation in this case.

**Alternatives**

| | |
|---|---|
| Protect: Flood-proofing/Backfill/Levees/Emerg Road | .297 |
| Accommodate: Dredge/Forecast/Monitor Water/Model | .319 |
| Retreat: Relocate affected homes | .229 |
| Status Quo: Do nothing | .155 |

**Table 10.P5. Final Adaptation Strategies Ranking for P5**

## Canadian Partners Comparison of Community Partners' Adaptive Strategies Ranking

Figure 10 below summarizes the adaptive strategies ranking results for the four Canadian Community Partners and compares them to the group's overall average and that of the original Case Study. These results demonstrate that there is a general overall preference for the "Accommodate" strategy over the "Protect" strategy in 3 of the 4 partners' inputs (in one case the Protect option was strongly preferable to the Accommodate option). The Retreat strategy is everywhere ranked as the third most preferable option and is similar in weight across all Canadian partners.

In all of these cases, the Status Quo/Do Nothing strategy was regarded as being significantly weaker as an adaptation strategy with lowest ranking weights for all partners. This indicates clearly from the indicated priority weighting and utility inputs that it is always better to act than not to act, i.e., the opportunity cost of not acting, or "doing nothing" is significant for all partners.

The results of the four Canadian partners compare well with the original case study outcomes and are reflected in the group average as shown in Figure 10 below.

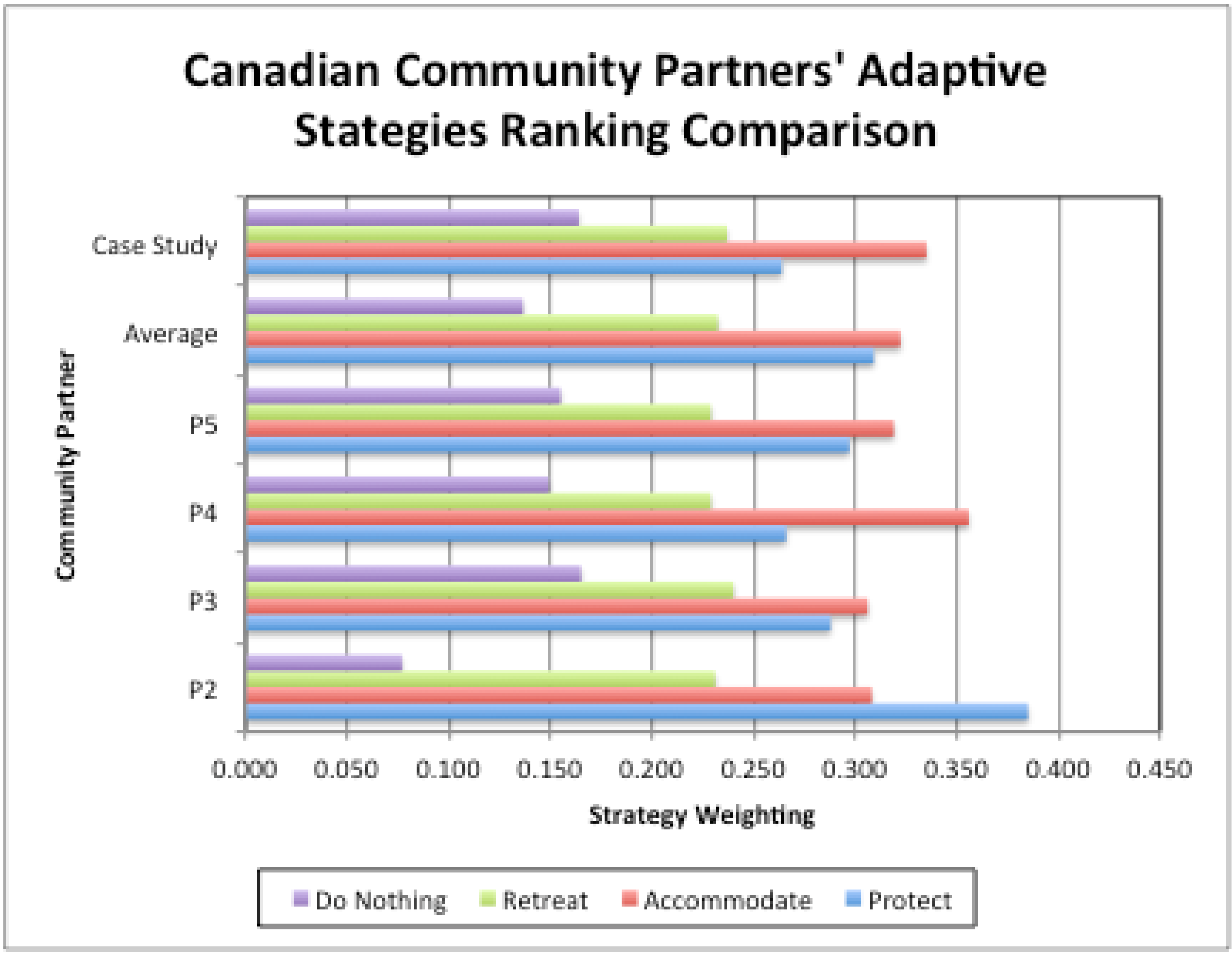



**Figure 10. Canadian Partners' Adaptive Strategies Ranking**

**All Partners Comparison of Community Partners' Adaptive Strategy Ranking**

The comparison of the Caribbean and the Canadian Partners adaptive strategies ranking are presented in Figure 11 below and represent a summary of the Caribbean partners results (Figure 8) and Canadian partners results (Figure 10).

It is not surprising that despite the different and varied inputs for pillar priorities and utility measures from all the partners, the overall strategy ranking results are generally consistent on average. After all, while the partners' inputs are varied, they represent only a portion of the full model input that arguably retains the original case study characteristics. Nevertheless, there is consistency and similarity in strategy ranking evident from Figure 11 below and these results indicate a certain robustness in partner results and strategy rankings. These results are characterized – as per the original case study results - by overall preference for the "Accommodate" strategy followed closely by the second best "Protect" strategy. In all cases, the "Retreat" option is judged to be a distant and consistently third choice for Caribbean, Canada, and the overall Average strategy ranking for all partners.

In all of these cases, and as before, the Status Quo/Do Nothing strategy is regarded as being significantly weaker as an adaptation strategy compared to all other active adaptation options. This indicates clearly from the indicated priority weighting and utility inputs that it is always better to act than not to act, i.e., the opportunity cost of not acting, or "doing nothing" is significant for all Caribbean and Canadian partners, without question. Finally, it is noted from Figure 11 that the results of the four Caribbean and the four Canadian partners compare well with the original case study outcomes and are reflected in the overall all partners' Average.

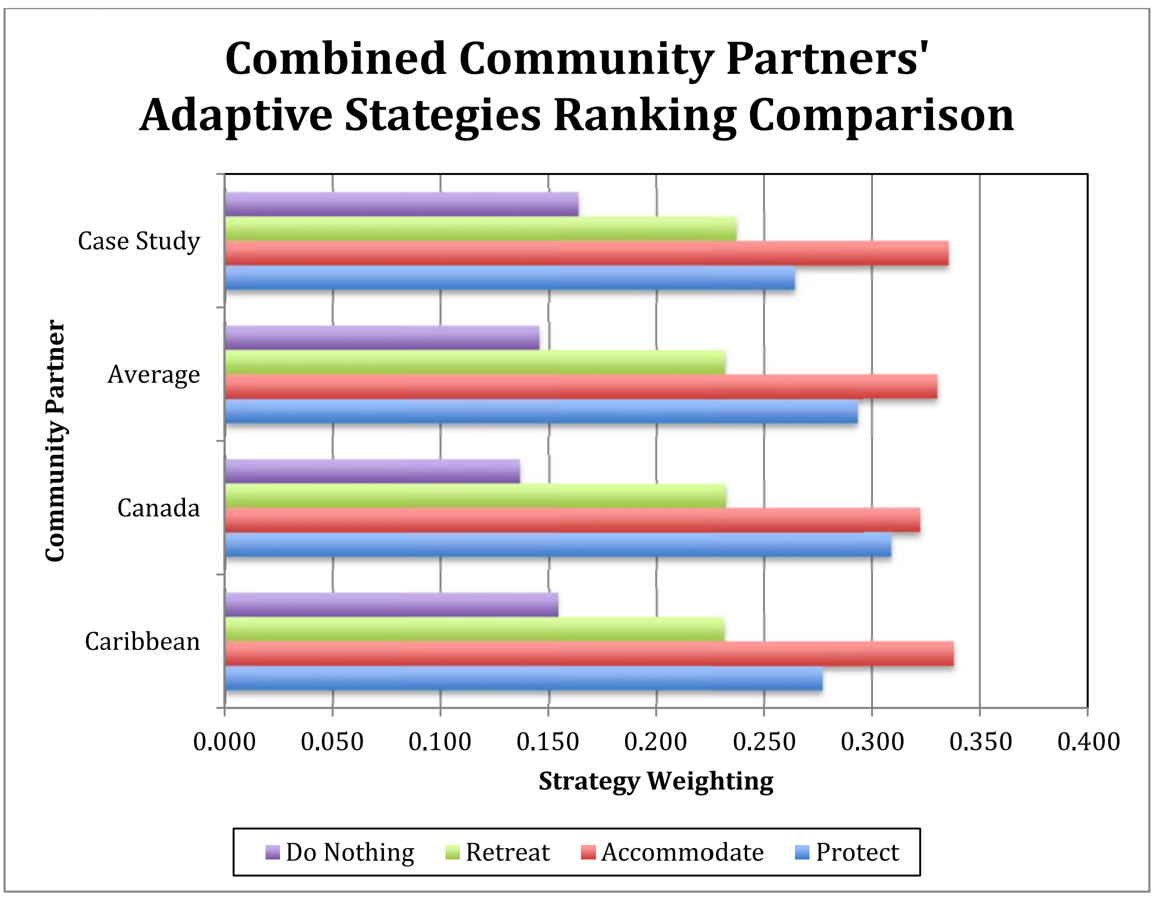



**Figure 11. Combined Community Partners' Adaptive Strategies Ranking**

**Discussion**

This report compiles and compares the original illustrative case study results for the Perth-Andover spring flooding problem for sets of inputs provided by the C-Change community partners who participated in the Community of Practice meeting sin Ottawa in October 2012.

As noted above, despite the differences expressed by the partners in terms of: (1) their personal community profile priorities for the environmental, economic, social, and cultural pillars of the community; and (2) their subjective interpretation of flood damage impacts, e.g., road closure impact valuations, the overall ranking results provide a robust and ordered ranking of the alternative adaptation strategies expressed as: 1. “Accommodate”; 2. “Protect”; 3. “Retreat”, and, lastly 4. “Status Quo/Do Nothing”.

These results clearly indicate system-wide decision support for adaptation action as opposed to inaction, and reflects an inherent strategic long-term perspective to preparing and reducing environmental event damage.

It is anticipated that this exercise of evaluating adaptation strategies is applicable to each C-Change community in the context of their particular circumstances and in relation to specific decisions to be made. A summary of potential C-Change community examples and application for analysis in this exercise are noted in the table below.

| Region | Community | Potential Case | Adaptive Alternatives for Evaluation |
|---|---|---|---|
| **Caribbean** | 1. Georgetown, Guyana | Seaside flooding | Preparation of run-off; improved setback and property management |
| | 2. San Pedro, Ambergris Cay, Belize | Bleaching of barrier reef | Access management for fisheries and tourism |
| | 3. Bequia, STV&G | Sources of water supply in the event of drought | Cistern storage; desalinization operation |
| | 4. Grande Riviere, Trinidad & Tobago | Beachfront reinforcement for development | Redirect river outflow; reinforcement beach |
| **Canada** | 1. Iqaluit, Nunavut | Town Dump site analysis | Move site; manage seepage |
| | 2. Gibsons, British Columbia | Sechelt isthmus road closure; protection against drought | Reinforce road; |
| | 3. Isle Madame. Richmond County | Little Anse Breakwater | Improve breakwater; rebuild road and alternative exits; retreat |
| | 4. Charlottetown, P.E.I. | Harbourfront Plan analysis | Setback on new development; protection of existing infrastructure |

These examples of problem specifics present opportunities for community-based discussions and enhanced capacity for developing and supporting adaptive decisions using the decision support methods illustrated in this report.

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