## Research and Development in Canadian Industry Intended to Directly Benefit Developing Countries - Estimation

Units were stratified using Generalized Sampling System 4.3, developed at Statistics Canada. Variables from external sources, such as total intramural expenditures (research and development from the RDCI survey) were used with the cumulative function of the root of f to form strata. Two strata were thus created: TIE  $\leq$  \$34 million and TIE > \$34 million. A unit with a TIE value that was extreme in relation to the other units was then separated into a third stratum.

Two sets of weights were calculated, one for section 1 (research and development expenditures) and one for the rest of the questionnaire. With deterministic imputation, it was possible to use the units that answered No on the pre-contact card (no research and development directed toward less fortunate countries), and hence No to Question 1, for the estimation of Section 1 of the questionnaire. This helped to increase the number of respondents for this section and thus reduce weights and the variance. However, these units cannot be used for estimating the other sections of the questionnaire, since it would have been necessary to do total imputation because they did not receive the questionnaire.

The units have an initial weight of 1, since this is a census. The unit in stratum 3 has a final weight of 1 since, being alone in its stratum, it does not represent any other unit in the population. The weights of the units in the other two strata were adjusted by stratum to take total non-response into account:

 $(\frac{N_h}{n_h}).$ 

Generalized Estimation System 4.2, developed at Statistics Canada, was used for estimation.

The estimation is carried out according to the one-stage stratified sampling plan and one phase with element sampling. It would have been preferable to use the one-stage stratified plan and two phases, but given the resources available and since the effect on the estimates and the variance was expected to be minimal, we used the one-phase plan.