APPENDIX 13

GETTING VALUES OF ADJUSTMENT FACTORS

The input data required for the WAPROS model also included seven adjustment factors, besides six parameters. Preliminary values of few process and storage variables were estimated by the model to reduce the input requirement from the user. Such variables are watershed dependent and are not universal constants. Moreover, such variables, though important, could not be exactly estimated due to measurement difficulty, spatial variability, un-observability and abstract nature of data. Hence, initial values of such variables were estimated and then proposed to be fine-tuned with adjustment factors, to get the final values matching the watershed characteristics.

The parameters used in the model represent those watershed variables that could not be measured or estimated. Neither the modeler nor the user cannot assume even initial values. In practice, it was noticed that adjustment factors were linearly related to the process values causing them to vary from zero to maximum, while the parameters have curvilinear relationship impacting the process value to reach maximum at some intermediate point called optimum point and decreased on both the sides of optimized value. While the parameters are variables themselves, the adjustment factors are only modifiers to variables and these are not variables as such. Hence, adjustment factors cannot be called as proxies or other form of parameters.

The currently available models would be using such adjustment factors internally, but in WAPROS model those adjustment factors were given externally to vary their values to suit the watershed. These adjustment factors are considered as soft data, or judgment data, and proposed to be given
by experts or experimentalists working in the watershed. However, it was very much difficult to identify experimentalists and experts and elicit required data.

The experts contacted for acquiring values for adjustment factors included professors, soil scientists, watershed engineers, research scholars, forest scientists and villagers. The exhibits or products used to elicit data included model simulation outputs, model graphs, comparative data and comparative graphs.

It was difficult to get experts’ opinion or data through Delphi technique as quoted in many literature. The arrangement to assemble all the experts in one place did not materialize, and often multiple sessions were held with one or two experts at a time. The responses were often qualitative.

Hence an alternative procedure was devised, as advised by a professor, to relate the values of adjustment factors to their impact on changes in %age. Accordingly, five values for each adjustment factor were prefixed and their impact on related processes and channel flow were estimated and presented. It was like presenting five scenarios for each factor. The preferences of 18 experts were obtained over five choices, for seven factors.

Later, the choices were translated into the respective factor values and then averaged. These averaged values were then used as values of adjustment factors and given as input data in IWATSHED. DAT file.