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Development of catchment research, with particular attention to Plynlimon and its forerunner, the East African catchments

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Dr J.S.G. McCulloch was deeply involved in the establishment of research catchments in E Africa and subsequently in UK to investigate land use change impacts on hydrology. Comparison of these studies provides an insight into how influential his inputs and direction have been in the progressive development of the philosophy, the instrumentation, and the analytical techniques now employed in catchment research. There were great contrasts in the environments: tropical highland (high radiation, intense rainfall) vs. temperate maritime (low radiation and frontal storms), different soils and vegetation types, as well as the differing social and economic pressures in developing and developed nations. Nevertheless the underlying scientific philosophy was common to both, although techniques had to be modified according to local conditions. As specialised instrumentation and analytical techniques were developed for the UK catchments many were also integrated into the East African studies. Many lessons were learned in the course of these studies and from the experiences of other studies around the world. Overall a strong, rigorous science approach was developed with widespread applicability. Beyond the basics of catchment selection and the quantification of the main components of the catchment water balance, this involved initiating parallel process studies to provide information on specific aspects of catchment behaviour. This information could then form the basis for models capable of extrapolation from the observed time series to more extreme events and, ultimately, the capability of predicting the consequences of changes in catchment land management in a range of climates.