Problem based, on problem number 15 from Box, Hunter and Hunter

Box, G. E. P., Hunter, W. G., & Hunter, J. S. (1978). *Statistics for Experimenters*. New York: John Wiley & Sons, p. 125.

Nine samples were taken from two streams, four from one and five from the other, and the following data obtained:

Pollution level in stream 1 (ppm)	Pollution level in stream 2 (ppm)
16	9
12	10
14	8
11	6
	5

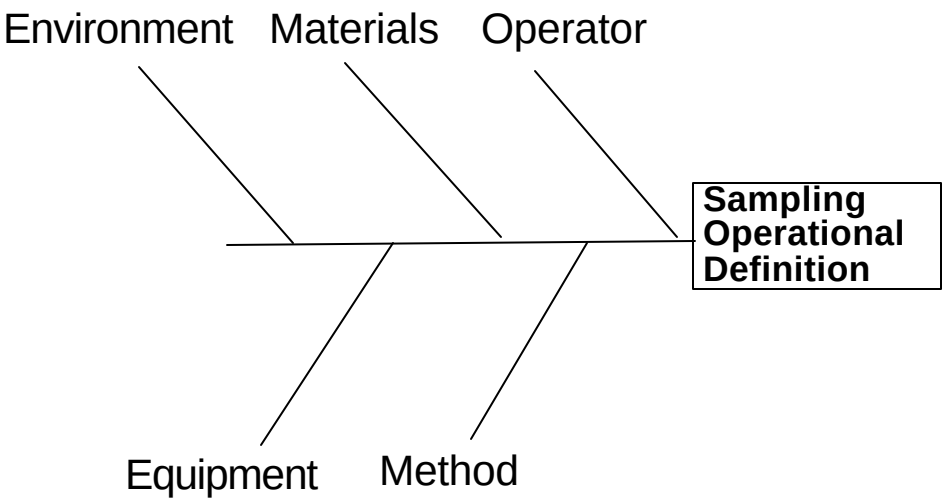
It is claimed that the data proves that stream 2 is cleaner than stream 1.

A statistician asked the following questions:

When was the data taken?
All in one day? On different days?
Were data taken during the same time period for the two streams?
Were the temperatures of the two streams the same?
Where in the streams were the data taken?
Why were these points chosen?
Are they representative?
Are they comparable?

Why do you think these the statistician asked these questions?
Are there other questions that should have been asked?
Is there any set of answers to these questions etc. that would justify the use of a t-test to draw conclusions?
What conclusions?

W. Edwards Deming discussed the importance of operational definitions in his book “Out of Crisis”. In this problem context it provides a framework to address the questions presented above concerning the measurement system variation by defining a systematic procedure.


Environment
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