Material balance Theory

Dr Gunjan Pandey

"Material balance theory studies the relationship between the environment and the economy in this model we assume that the economy is made up of the production sector and the household consumption sector" T Eugine

Assuming the economy in this model of a 2 sector nature, existing in the environment the material balance model can be explained as follows:

The **production sector** is referred to as R units of raw material from the environment to produce F units of the final product while doing so it also produces W1 amount of waste.

Thus, production sector equation is :

$$R=F+W1$$

The **household sector** consumes all the F units which are produced in the production sector there is a lot of waste produced also this waste can be packaging byproducts, etc. hey this entire amount is returned to the atmosphere producing W2 units of waste. Thus, the household sector equation is:

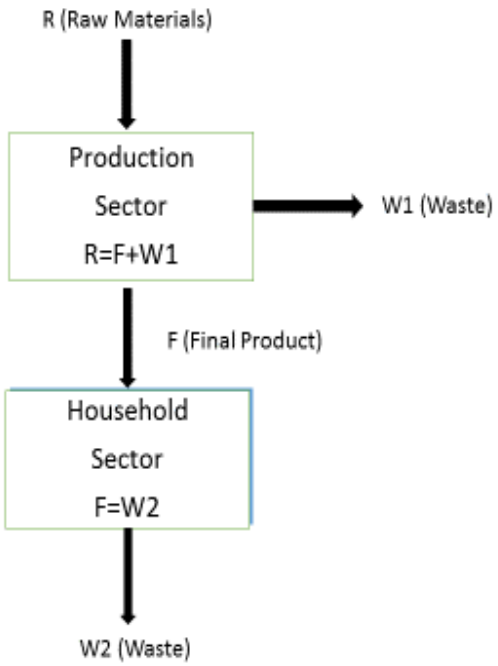
$$F = W2$$

hence in the economy

$$R = W1 + W2$$

The entire mass of inputs (raw material) equals the entire mass of output (waste). This is the **material balance model**

Environment



The functions of an economy are related to production, consumption and distribution activities. These activities have a direct relation with nature. Nature provides raw materials to the economy for its production and consumption activities. Residuals from both the production and consumption processes usually remain and they usually render disservices like killing fish, reducing public health, soiling and deteriorating buildings due to industrial pollution.

Some wastes (residuals) from production and consumption activities are ultimately returned to nature. Remaining wastages are recycled. Further, all emission of residuals do not cause pollution damage because of assimilative capacity of the environment.

Further, energy that is taken out of the environment must reappear somewhere else in the economic system. Its form may, however, be changed so that it appears as waste products and gases. Moreover, waste energy cannot be recycled but waste materials

can be used up to a point. It means that economic activity always affects environment in a direct or indirect manner.

Thus the law of conservation of matter and energy holds that matter can be transformed to other matter or into energy but can never vanish. All inputs (fuels, raw materials, water and so forth) used in the economy's production processes will ultimately result in an equivalent residual or waste. The model is explained in the Material Flow Diagram.

The material flow diagram implies that mass inputs must equal mass outputs for every process. Moreover, all resources extracted from the environment must eventually become unwanted wastes and pollutants.Hence, the materials balance model provides a useful framework for analyzing alternative methods of resource and residuals management.

Thus, economics of the environment may be defined as a study which concerns allocation of resources among alternative uses in such a way that there is an efficient reduction of the waste or residuals in the environment, which lead to an increase in social welfare. Diagram by **Ayres Kneese** of material balance model

Flow Diagram.