AFM UPDATES-SESSION 2

Ebbay is planning to launch a new product, which can be introduced initially in Western India or in the whole country. If the product is introduced only in western India, the investment outlay will be Rs.12 million. After two years, the company can evaluate the project to determine whether it should cover the whole country. For such an expansion it will have to incur an additional investment of Rs.10 million. To introduce the product in the whole country right in the beginning, it would involve an outlay of Rs. 20 million. The product, in any case, will have a life of 5 years, after which the plant will have zero net value.

If the product is introduced only in west India, demand would be high or low with the probabilities of 0.8 and 0.2, respectively and annual cash inflow of Rs.4 million and Rs.2.5 million, respectively.

If the product is introduced in the whole country right in the beginning the demand would be high or low with the probabilities of 0.6 and 0.4, respectively and annual cash inflows of Rs.8 million and Rs.5 million, respectively.

Based on the observed demand in Western India, if the product is introduced in the entire country the following probabilities would exist for high and low demand on an all India basis:

Western India	**Whole Country**	
	High Demand	**Low Demand**
High demand	0.90	0.10
Low demand	0.40	0.60

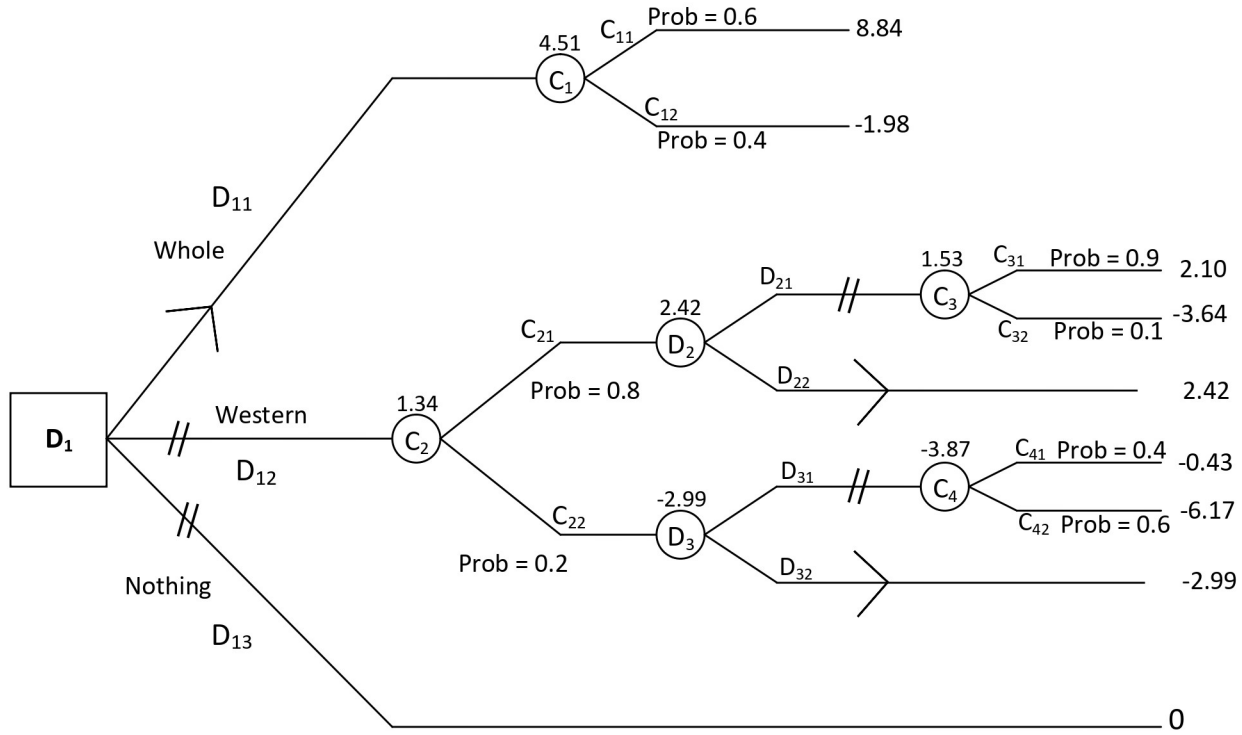
The hurdle rate applicable to this project is 12 per cent.

a. Set up a decision tree for the investment situation.

b. Advise Ebbay on the investment policy it should follow. Support your advice with appropriate reasoning.

ANSWER:

a. The decision tree based on the information given in the problem is depicted in the following figure.



C_{11}= 8× PVAF (12%, 5) – 20 = 8.84

C_{12} = 5× PVAF (12%, 5) – 20 = -1.98

At C_1 expected NPV = 0.6 × C_{11} + 0.4 × C_{12} = 4.512……this is applicable for D_{11}

C_{31} = 4 × PVAF (12%, 2) + 8 ×PVAF(12%, 3) × PVIF(12%,2) – 12 – 10 × PVIF (12%,2) = 2.1

C_{32} = 4 × PVAF (12%, 2) + 5 ×PVAF(12%, 3) × PVIF(12%,2) – 12 – 10 × PVIF (12%,2) = -3.64

Expected NPV at C_3= 0.9 × C_{31}+ 0.1 × C_{32} = 1.53……this is for D_{21}

At D_{22} expected NPV = 4 × PVAF (12%, 5) – 12 = 2.42

At D_2, we move towards D_{22} and therefore expected NPV = 2.42……this is applicable for C_{21}

C_{41}= 2.5 × PVAF (12%, 2) + 8 ×PVAF(12%, 3) × PVIF(12%,2) – 12 – 10 × PVIF (12%,2) = - 0.43

C_{42} = 2.5 × PVAF (12%, 2) + 5 ×PVAF(12%, 3) × PVIF(12%,2) – 12 – 10 × PVIF (12%,2) = -6.17

EMV at C_4 = 0.4 × C_{41}+ 0.6 × C_{42} = -3.87……this is applicable for D_{31}

At D_{32} expected NPV = 2.5 × PVAF (12%, 5) – 12 = -2.99

At D_3 = we move towards D_{32} and therefore expected NPV = -2.99…… this is applicable for C_{22}

At C_2 expected NPV = 0.8 × 2.419 + 0.2 × (-2.99) = 1.34……this is applicable for D_{12}

At D_{13} expected NPV = 0

b. At $D_{1,}$ we have three alternatives:

- D_{11} Launch whole country – NPV = 4.51
- D_{12} Launch western India only – NPV = 1.34
- D_{13}Do not Launch whole country – NPV = 0

So, we move towards $D_{11.....}$ in other words, we decide to launch the product in the whole country right away and this is expected to provide an expected NPV of 4.51m.