**.FORTH Lecturer**

**INCREASING N USE EFFEICIENCY**

 **Since fertilizer N efficiency is determined by the biomass yield and**

**N – Uptake by acrop , all factors that affect biomass yield and N concentration in tissue will affect N use efficiency .**

**These factors can be classified into :**

**1-Soil factors**

 **\* Initial fertility – very fertile soils give lower fertilizer N response**

**\*\* texture and stracture – more leaching occurs in light , sandy soil**

**\*\*\* PH , salinity / alkalinity – greater ammonia volatization occurs**

 **In calcareous and alkaline soils**

**\*\*\*\* topography – surface runoff losses are greatest from upper**

 **Topographic regions**

**\*\*\*\*\* drainage – poor drainage can lead to large denitrification losses**

**2- crop factors**

* **Choice of crop ( where more than one crop can be grown)**

**Its yield potential ( N uptake potential )**

**\*\* choice of crop variety , its growth periods , yield potential**

 **And efficiency of nutrient utilization**

**\*\*\* resistance of variety to diseases and pests , drought and other stress factors**

**\*\*\*\* resistance of crop variety to soil problems such as water , logging , salinity , alkalinity , ,nutrient toxicities**

**3- Environmental factors**

* **Rainfall and its distribution – large rain can lead to severe runoff**

**And leaching losses**

**\*\* sunny days and sunshine hour day length , heat ---**

**4- agronomic practices**

**\*Timely sowing – delays can reduce yield**

**\*\* adequate plant population**

**\*\*\* water management – water efficient irrigation practices**

 **In irrigated areas , water conversation practice for dryland conditions**

**5- fertilizer management**

* **Rate of application matched to crop needs**

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* **Method of application to reduce nutrient losses**





* **Time of application matched to crop nutrient uptake**



* **Source of N- modified urea materials , NH4/NO3 ratio , liquid**
* **Fertilizer amendments – nutrification and urease inhibitors , coatings**

**Nitrification inhibitors**

 **Since leaching and denitrification losses of fertilizer N take place Only after ammonium or ammonium – producing fertilizers are nitrified , retarding the Nitrification rate has been considered one way to reduce N Losses then increase N- efficiency**

**NOTE ,**

**N - fertilizer is maintained primarily in the ammonium ( non leaching ) Form for several weeks until plant growth and N uptake rates increase to extent that much of nitrate formed is used immediately And nitrates do not accumulate in soil .**

**Fifth Lecture**

**Nitrification inhibitors (NIS)**

**As a group of agrochemical with development of N-serve or nitrapyrin ( 2- chloro-6 pyridine )**

 **Since , large number of chemicals have been reported as NIS , but only seven have been produced commercially , AM( 2-amino -4- chloro -6 methyl pyrimidine) , DCD ( Dicyandiamide ) , ST( 2- sulfanilamide thiozole), thiourea , ferrozole , MBT(2- mercaptobenzothiazole )**

**One natural product , namely , neem (seed extract )**

 **Slow -release N fertilizers**

**Sulfure -coated urea**