Where are the ATP and NADPH Used?

Out of ATP, NADPH & O_2 (product of light reaction) O_2 diffuses out and ATP & NADPH are used in synthesis of food in Biosynthetic Phase.

Dark reactions occur during the day time & is independent of light but depends on product of light reaction hence calling Biosynthetic phase Dark Reaction is a misnomer.

- Malvin Calvin & his colleagues used radioactive ^{14}C in algae photosynthesis to discover that first CO_2 fixation product;
- **C3 Pathway-** In most of the plant he discovered that first product is **3-carbon organic compound** (3-phosphoglyceric acid) or **PGA**.
- **C4 Pathway-** Later on a new compound was discovered in some other plants which contain **4-carbon** called **Oxaloacetic Acid** (OAA).
- **Primary CO2 acceptor-** 5 carbon product Ribulose Bisphosphate **(RuBP)**

Calvin Cycle

- Calvin cycle occurs in both C3 and C4 pathway.

1. **Carboxylation** is the fixation of CO_2 into two molecules of 3-phosphoglyceric acid (3-PGA) in presence of enzyme **RuBP carboxylase (RuBisCO)**.
2. **Reduction** is series of reaction that leads to formation of glucose. 2 ATP and 2 NADPH are required for reduction of one molecules of CO_2.
3. **Regeneration** - RuBP is regenerated utilizing 1 ATP.

Six turns of this cycle are required for synthesis of one molecule of Glucose.

In	Out
Six CO_2 18 ATP 12 NADPH	One glucose 18 ADP 12 NADP

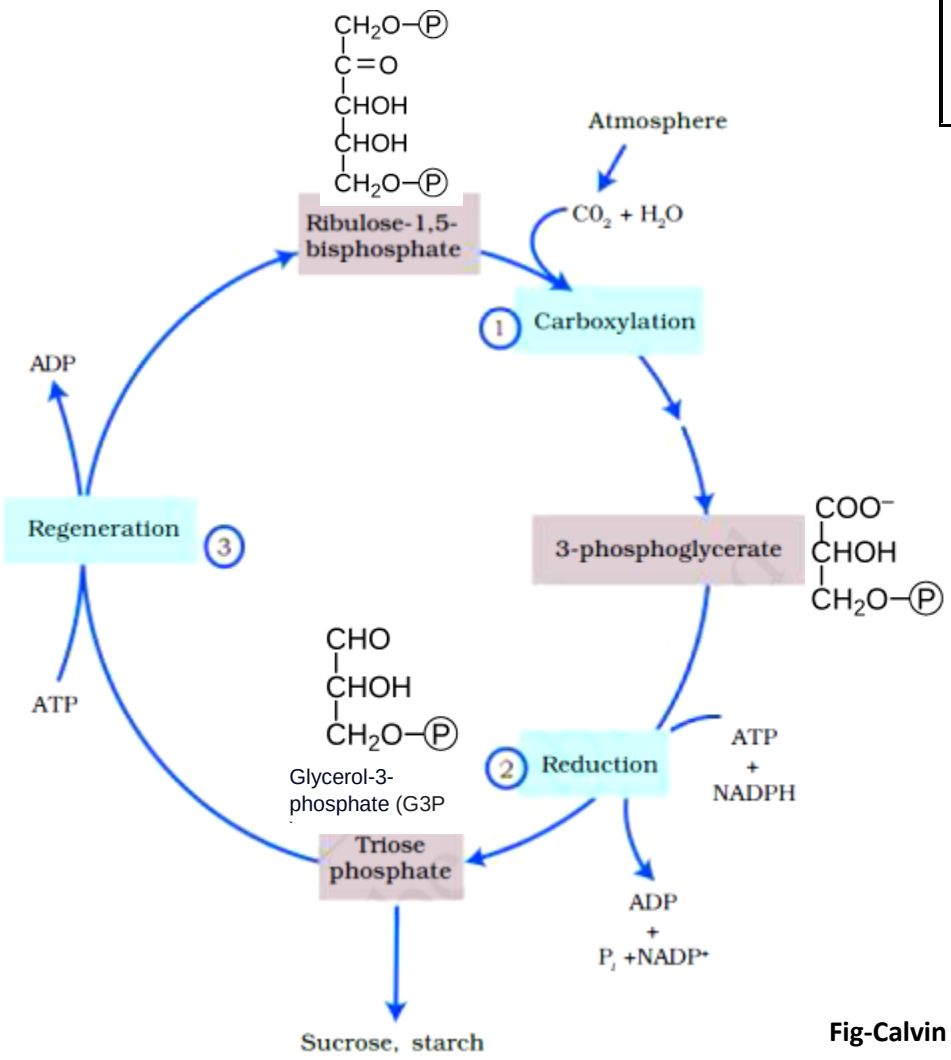

Fig-Calvin Cycle/ C3 Cycle