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“Perception of farmers on importance of pollination and pollinators in agricultural production”

A pollinator is the biotic agent, animal or vector which moves pollen from anthers of a flower to the stigma of another or same flower to accomplish fertilization of a flower. Pollination is a key process in seed and fruit formation, making it a critical determinant in food production. In addition, they benefit by increasing food production, food security that in turn improve livelihoods and play a great role in conserving biological diversity in agricultural and natural ecosystems. Insect pollinators contribute to the productivity of more than 75 per cent of important crop species (Klein *et al.*, 2007). Direct contribution of insect pollination to Indian agriculture is staggering Rupees 1,12,615.73 crores (USD 22.52 billion) annually, representing 8.72 per cent, besides spill over benefits of increase in quality traits, seed production, breeding efficiency, etc. For stagnant Indian agriculture, this “micro concept” of using honey bees for planned pollination of crops has the potential “macro-economic” impact. Thus, conservation of pollinators has become crucial for advancing United Nations Sustainable Development Goals. Understanding farmers’ perceptions on the role of pollinators and the practices adopted to promote them is essential and highly relevant to influence the way farmers manage their farms and participate in the implementation of agri-environmental measures. Keeping these aspects in view, the present seminar has been conceptualized with the following objectives.

1. To understand the concept of perception.
2. To know the perception of farmers on importance of pollination and pollinators in agricultural production and institutional role to change the perception of the farmers.
3. To review the related studies.

Concept of perception

Perception (from the Latin *perceptio*, meaning gathering or receiving) is the organization, identification, and interpretation of sensory information in order to represent and understand the presented information or environment. Perception refers to way we understand the world around us. Differs from person to person based on their needs, values and expectations. People respond to the situation based on perception of reality than the reality itself. Perception in communication determines how one will communicate and how they will receive information from another person. Because of different personalities, cultural differences or past experiences, what one person intends to communicate may be differently perceived by another. Some of the factors that influence perception and communication include

self-perception, learned perception, environmental perception and cultural perception. **Sensation** occurs when sensory receptors detect sensory stimuli. **Perception** involves the organization, interpretation, and conscious experience of those **sensations**. Difference between sensation and perception are as follows:

SENSATION	PERCEPTION
1. Process of receiving information via senses which can be later interpreted by brain.	1. process of interpreting the information received through senses.
2. Source is the stimuli from sense organs.	2.source is the information sent to brain from organs.
3.Results in perception.	3.Results in interpretation of the information.
4. It is a biological process.	4.It has a psychological significance.

PROCESS OF PERCEPTION:

Perception is the process of selecting, organizing, and interpreting information. This process includes the perception of select **stimuli** that pass through our **perceptual filters**, are organized into our existing structures and patterns, and are then interpreted based on previous experiences. Although perception is a largely cognitive and psychological process, how we perceive the people and objects around us affects our communication. We respond differently to an object or person that we perceive favorably than we do to something we find unfavorable. But how do we filter through the mass amounts of incoming information, organize it, and make meaning from what makes it through our perceptual filters and into our social realities. The stages in perceptual process are as follows:

Exposure

We take in information through all five of our senses, but our perceptual field (the world around us) includes so many stimuli that it is impossible for our brains to process and make sense of it all.

Attention

Attention is the next part of the perception process, in which we focus our attention on certain incoming sensory information. Since we can't tune in to each and every one of the thousands of messages and images we're exposed to daily, we tend to only pay attention to information that we perceive to meet our needs or interests. This type of **selective attention** can help us meet critical needs and get things done.

Interpretation

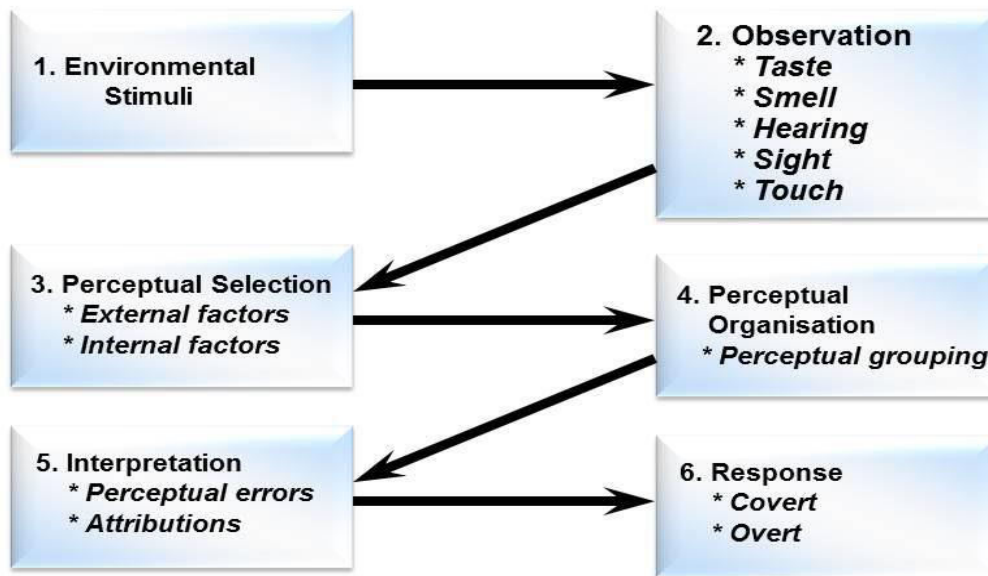
Although selecting and organizing incoming stimuli happens very quickly, and sometimes without much conscious thought, interpretation can be a much more deliberate and conscious step in the perception process. **Interpretation** is the third part of the perception process, where we assign meaning to our experiences using mental structures known as schemata. **Schemata** are like databases of stored, related information that we use to interpret new experiences. We all have fairly complicated schemata that have developed over time as small units of information combined to make more meaningful complexes of information.

Adaptation

A fundamental process of perception is **sensory adaptation** — a decreased sensitivity to a stimulus after prolonged and constant exposure. When you step into a swimming pool, the water initially feels cold, but after a while you stop noticing it. *After prolonged exposure to the same stimulus, our sensitivity toward it diminishes and we no longer perceive it.* The ability to adapt to the things that don't change around us is essential to our survival, as it leaves our sensory receptors free to detect the important and informative changes in our environment and to respond accordingly.

Flow chart showing the perceptual process is as follows:

The Perception Process



(Hellriegel et al, p. 75, 1999)

FACTORS AFFECTING PERCEPTION PROCESS:

Characteristics of the Perceiver

Several characteristics of the perceiver can affect perception. When an individual looks at a target and attempts to interpret what he or she, that interpretation is heavily influenced by personal characteristics of individual perceiver. The major characteristics of the perceiver influencing perception are:

- A. **Attitudes:** The perceiver's attitudes affect perception. For example, suppose Mr. X is interviewing candidates for a very important position in his organization –a position that requires negotiating contracts with suppliers, most of whom are male. Mr X may feel that women are not capable of holding their own in tough negotiations. This attitude will doubtless affect his perceptions of the female candidates he interviews.
- B. **Moods:** Moods can have a strong influence on the way we perceive someone. We think differently when we are happy than we do when we are depressed. In addition, we remember

information that is consistent with our mood state better than information that is inconsistent with our mood state. When in a positive mood, we form more positive impression of others. When in a negative mood, we tend to evaluate others unfavourably.

C. **Motives:** Unsatisfied needs or motives stimulate individuals and may exert a strong influence on their perceptions. For example, in an organizational context, a boss who is insecure perceives a subordinate's efforts to do an outstanding job as a threat to his or her own position. Personal insecurity can be transferred into the perception that others are out to "get my job", regardless of the intention of the subordinates.

D. **Self-Concept:** Another factor that can affect social perception is the perceivers' self-concept. An individual with a positive self-concept tends to notice positive attributes in another person. In contrast, a negative self-concept can lead a perceiver to pick out negative traits in another person. Greater understanding of self allows us to have more accurate perceptions of others.

E. **Interest:** The focus of our attention appears to be influenced by our interests. Because our individual interests differ considerably, what one person notices in a situation can differ from what others perceive. For example, the supervisor who has just been reprimanded by his boss for coming late is more likely to notice his colleagues coming late tomorrow than he did last week. If you are preoccupied with a personal problem, you may find it hard to be attentive in class.

F. **Cognitive Structure:** Cognitive structure, an individual's pattern of thinking, also affects perception. Some people have a tendency to perceive physical traits, such as height, weight, and appearance, more readily. Others tend to focus more on central traits, or personality dispositions. Cognitive complexity allows a person to perceive multiple characteristics of another person rather than attending to just a few traits.

G. **Expectations:** Finally, expectations can distort your perceptions in that you will see what you expect to see. The research findings of the study conducted by Sheldon S Zalkind and Timothy W Costello on some specific characteristics of the perceiver reveal.

- Knowing oneself makes it easier to see others accurately.
- One's own characteristics affect the characteristics one is likely to see in others.
- People who accept themselves are more likely to be able to see favourable aspects of other people.
- Accuracy in perceiving others is not a single skill.

These four characteristics greatly influence how a person perceives others in the environmental situation.

Characteristics of the Target

Characteristics in the target that is being observed can affect what is perceived. Physical appearance plays a big role in our perception of others. Extremely attractive or unattractive individuals are more likely to be noticed in a group than ordinary looking individuals. Motion, sound, size and other attributes of a target shape the way we see it.

- Physical appearance plays a big role in our perception of others. The perceiver will notice the target's physical features like height, weight, estimated age, race and gender.
- Perceivers tend to notice physical appearance characteristics that contrast with the norm, that are intense, or that are new or unusual. Physical attractiveness often colours entire impression of another person. Interviewers rate attractive candidates more favourably and attractive candidates are awarded higher starting salaries.
- Verbal communication from targets also affects our perception of them. We listen to the topics they speak about, their voice tone, and their accent and make judgements based on this input.
- Non-verbal communication conveys a great deal of information about the target. The perceiver deciphers eye contact, facial expressions, body movements, and posture all in an attempt to form an impression of the target.
- The perceiver, who observes the target's behaviour, infers the intentions of the target.
- For example, if our manager comes to our office doorway, we think "oh no! he is going to give me more work to do". Or we may perceive that his intention is to congratulate us on a recent success. In any case, the perceiver's interpretation of the target's intentions affects the way the perceiver views the target.
- Targets are not looked at in isolation, the relationship of a target to its background influences perception because of our tendency to group close things and similar things together.
- Objects that are close to each other will tend to be perceived together rather than separately. As a result of physical or time proximity, we often put together objects or events that are unrelated. For example, employees in a particular department are seen as a group. If two employees of a

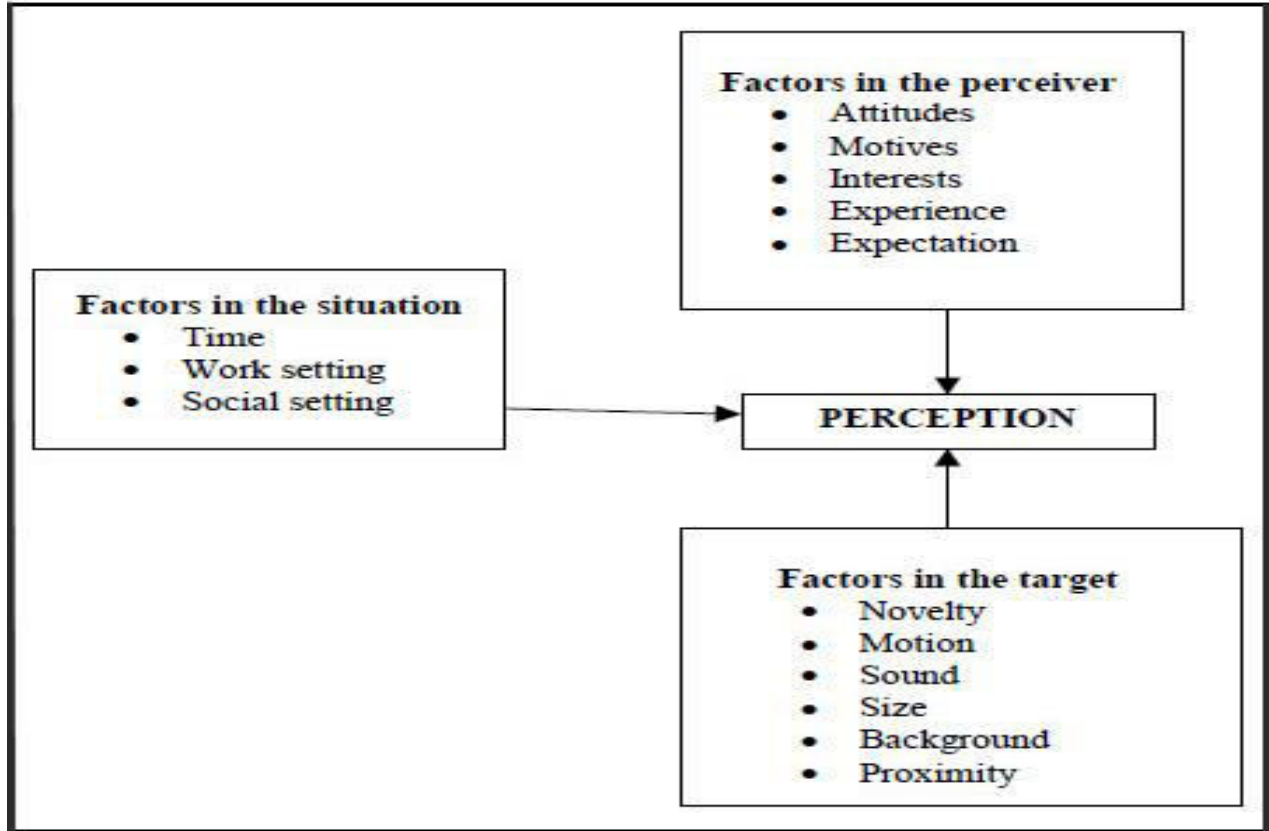
department suddenly resign, we tend to assume their departures were related when in fact, they might be totally unrelated.

- People, objects or events that are similar to each other also tend to be grouped together. The greater the similarity, the greater the probability we will tend to perceive them as a group.

Characteristics of the Situation

- The situation in which the interaction between the perceiver and the target takes place has an influence on the perceiver's impression of the target. For example, a professor may not notice his 20-year-old female student in a bikini at the swimming pool. Yet the professor will notice the same girl if she comes to his organizational behaviour class in a bikini. In the same way, meeting a manager in his or her office affects your impression in a certain way that may contrast with the impression you would form had you met the manager in a restaurant.
- The strength of the situational cues also affects social perception. Some situations provide strong cues as to appropriate behaviour. In these situations, we assume that the individual's behaviour can be accounted for by the situation, and that it may not reflect the individual's disposition. This is the discounting principle in social perception. For example, you may encounter an automobile sales person who has a warm and personable manner, asks you about your work and hobbies, and seems genuinely interested in your taste in cars. Can you assume that this behaviour reflects the sales person's personality? You probably cannot, because of the influence of the situation. This person is trying to sell you a car, and in this particular situation he probably treats all customers in this manner.

Diagrammatic representation of factors affecting perception:



PRINCIPLES OF PERCEPTION:

Individuals tend to organize environmental stimuli into some meaningful patterns or whole according to some principles. Some of the important principles are:

- PRINCIPLE OF **FIGURE-GROUND RELATIONSHIP**
- PRINCIPLE OF **CLOSURE**
- PRINCIPLE OF **GROUPING**
- PRINCIPLE OF **SIMPLICITY**
- PRINCIPLE OF **CONTOUR**
- PRINCIPLE OF **CONTEXT**
- PRINCIPLE OF **CONTRAST**

Principle of figure-ground :

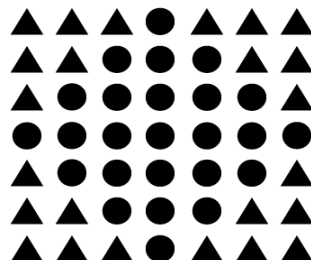
The figure-ground principle states that **people instinctively perceive objects as either being in the foreground or the background.** They either stand out prominently in the front (the figure) or recede into the back (the ground).



In the image above, for example, your eye instantly sees a white apple sitting on a black background.

Principle of similarity:

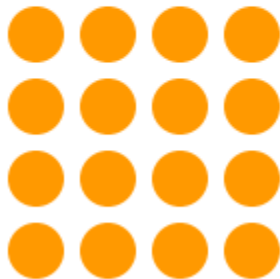
The principle of similarity states that when things appear to be similar to each other, we group them together. And we also tend to think they have the same function. For instance, in this image, there appear to be two separate and distinct groups based on shape: the circles and the squares.



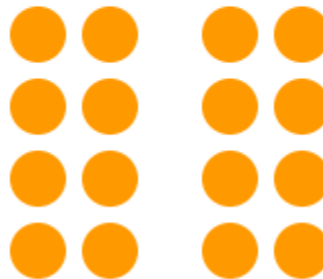
Principle of proximity:

The principle of proximity states that things that are close together appear to be more related than things that are spaced farther apart. Proximity is so powerful that it overrides similarity of color, shape, and other factors that might differentiate a group of objects.

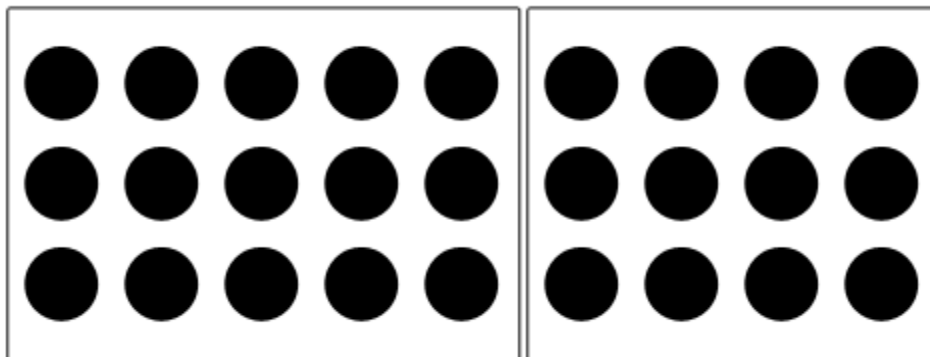
This is perceived to be one group and the components somehow related to each other.



We perceive two groups here, and understand that there are differences between them.

**Principle of common region:**

The principle of common region is highly related to proximity. It states that when objects are located within the same closed region, we perceive them as being grouped together.



Adding borders or other visible barriers is a great way to create a perceived separation between groups of objects—even if they have the same proximity, shape, color, etc.

Principle of continuity

The principle of continuity states that elements that are arranged on a line or curve are perceived to be more related than elements not on the line or curve.



In the image above, for example, the red dots in the curved line seem to be more related to the black dots on the curved line than to the red dots on the straight horizontal line. That's because your eye naturally follows a line or a curve, making continuation a stronger signal of relatedness than the similarity of color.

Principle of closure:

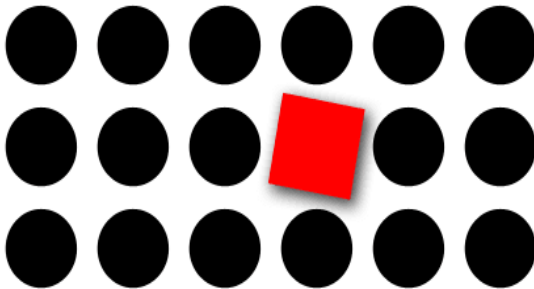
The principle of closure states that when we look at a complex arrangement of visual elements, we tend to look for a single, recognizable pattern. In other words, when you see an image that has missing parts, your brain will fill in the blanks and make a complete image so you can still recognize the pattern.



For example, when you look at the image above you most likely see a zebra even though the image is just a collection of black shapes. Your mind fills in the missing information to create a recognizable pattern based on your experience.

Principle of focal point:

The focal point principle states that whatever stands out visually will capture and hold the viewer's attention first.



When you look at the image above, for example, the first thing you notice is the red square because it's different than all of the black circles around it. It's the first point of interest that grabs your attention, and from there your attention moves to other parts of the image.

TYPES OF PERCEPTION:

Depth perception:

Depth perception is the visual ability to perceive the world in three dimensions (3D) and the distance of an object.

Motion perception:

Motion perception is the process of inferring the speed and direction of elements in a scene based on visual, vestibular and proprioceptive inputs. Although this process appears straightforward to

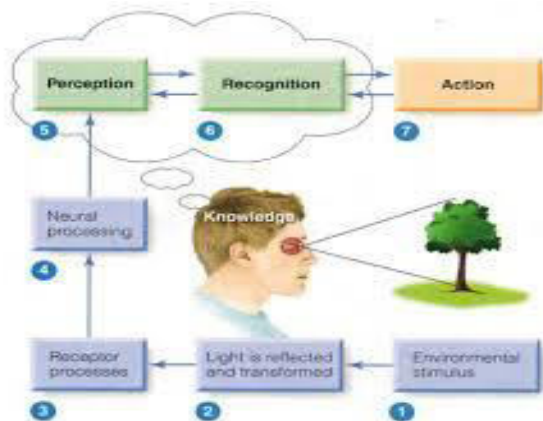
most observers, it has proven to be a difficult problem from a computational perspective, and difficult to explain in terms of neural processing.

Form perception:

Form perception is the recognition of visual elements of objects, specifically those to do with shapes, patterns and previously identified important characteristics. During visual processing information is not created, but rather reformatted in a way that draws out the most detailed information of the stimulus.

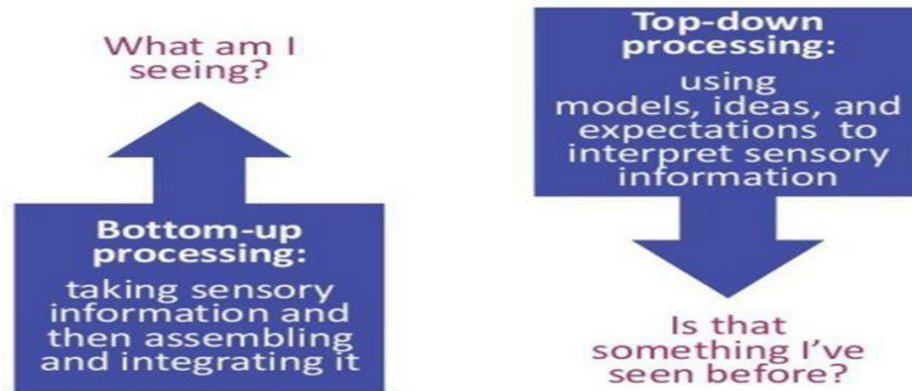
The importance of knowledge in the perceptual process:

Any information brought by the perceiver to a perceptual situation is knowledge. It has Particularly strong effect on the recognition.it has two types of processing i.e., TOP-DOWN and BOTTOM-UP processing. The following diagram shows how knowledge has important role in perceiving the known environment



Bottom-up versus Top-down processing

Bottom-up refers to the way it is built up from the smallest pieces of sensory information. Top-down processing, on the other hand, refers to perception that is driven by cognition. Your brain applies what it knows and what it expects to perceive and fills in the blanks, so to speak.



The importance of perception in communication:

When you communicate with someone, you convey a message that the other person is meant to perceive and decode. The simpler and more straightforward the message, the easier it is to perceive. For instance, asking someone if he is hungry is a simple communication that asks a direct question. But if you phrase it in a language the recipient doesn't know well or you put an inflection in your voice, it adds layers to the communication that the recipient might not get. For instance, the lilt in the question could be silently asking if the recipient wants to eat with you, though you didn't ask that question.

perception is process of sensory organs the mind gets the information through the five sense organs, i.e., eyes, nose, ears, tongue and skin. The stimulation comes to the organs through written messages, oral presentation, taste, touch etc. The perception starts with the awareness of these stimuli. Recognizing these stimuli takes place only after paying attention to them. These message are then translated into action.

The Relationship between Perception and Communication:

In any type of communication, there's always the chance that the intended meaning is lost in the communication. Because of different personalities, cultural differences or past experiences, what one person intends to communicate may be differently perceived by another. Some of the factors that influence perception and communication include self-perception, learned perception, environmental perception and cultural perception.

Types of Perception in Communication

Someone's perception is her reality. Perception in communication determines how one will communicate and how they will receive information from another person. Perception in communication is based on three elements. Your perception of others is the product of how you view yourself, that you remember things better if you relate to self and that you tend to ignore that which contrasts with your view of self.

Self-Perception

Your self-perception is the way you perceive yourself. The self-perception is based on your self-esteem, self-concept and self-efficacy. Your self-esteem is how much you value yourself. Your self-concept is designed by how you think people perceive you, how you're perceived in a group setting and your own perceptions based on past experiences. Self-efficacy is the predictions you make about yourself, such as "No matter what, I'm going to get that job."

Environmental

Environmental perceptions are formed based on the context in which the information is received. For example, if a child turned to a parent and said, "I hate you," that would have one obvious perception, but if you were practicing for a play and you read, "I hate you" in your script, the perception of the same words changes. One's environment will shape the perception that creates a mental filter in which they will process life and information through.

Learned

Learned perception is formed around personality, culture and habit. Learned perceptions are thoughts, ideas and beliefs that are formed by a person being taught. Whether they were formally taught or learned by example, an individual will process and react based on his or her learned perception. This can be seen in children reflecting their parent's personality traits, religious beliefs and philosophy on life.

Physical

Physical perception is based on the tangible world. It's the way your physical ears and eyes perceive something and how your mind processes it. For example, in U.S. culture, it would be

perceived as intrusive and rude for a stranger to stand close to you while you ride the bus, but in South American cultures, this is perceived as a norm. Another example of physical perception is our idea of color. Red represents danger or romance while blue represents calm or water. The way a person identifies with various colors is an example of physical perception.

Cultural

Cultural perception differs from environmental perception because it refers to larger scale of a society and not a specific environment based on the person's life. Culture perceptions will vary from city to city and region to region. "For instance, an Asian American woman possesses at least two distinct identities, each associated with different and sometimes conflicting domain-specific stereotypes," according to researchers at Harvard University's Interpersonal Perception and Communication Laboratory. Cultural perceptions are formed by the subsociety in which a person is raised.

Affect of perception on communication:

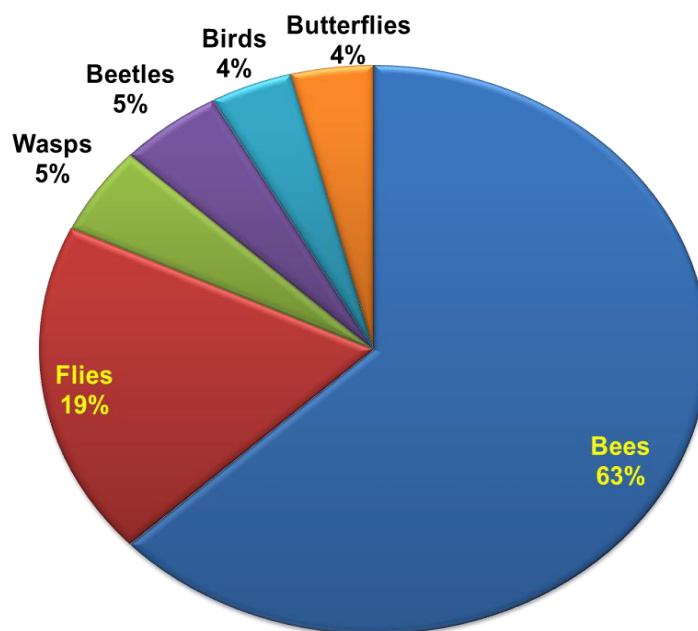
Perception is at the heart of our communication. Robert L. Scott, a communication scholar said that "Nothing is clear in and of itself but in some context for some person." Everybody perceives things differently. That does not mean that one person is right and the other wrong. It does mean that communication between individuals who have different perspectives requires more understanding, negation, persuasion, and tolerance of those differences.

IMPORTANCE OF POLLINATION AND POLLINATORS:

- A pollinator is the biotic agent, animal or vector which moves pollen from anthers of a flower to the stigma of another or same flower to accomplish fertilization of a flower.
- Pollination is a **key process in seed and fruit formation**, making it a critical determinant in food production and on farmer's income.
- Pollination is among a **valuable ecosystem services** which provides a variety of benefits including food and fiber, plant-derived medicines, ornamentals, aesthetics, genetic diversity, and overall ecosystem resilience.

- In addition, they benefit by **increasing food production**, food security that in turn improve livelihoods and play a great role in conserving biological diversity in agricultural and natural ecosystems.
- Good pollination can increase the **stability of crop production**, reducing year to year and place to place variability in yield, by buffering effect of climate change and changing land use.
- World top pollinators contributing to the yield of different crops are 73 per cent bees, 6.5 per cent flies, 5 per cent beetles, 5 per cent wasps, 4 per cent birds, 4 per cent butterflies and moths.
- Insect pollinators contribute to the productivity of more than 75 per cent of important crop species (Klein *et al.*, 2007), representing 35 per cent of the global crop production volume.
- Direct contribution of insect pollination to Indian agriculture is staggering Rupees 1,12,615.73 crores (USD 22.52 billion) annually, representing 8.72 per cent, besides spill over benefits of increase in quality traits, seed production, breeding efficiency, etc.
- For stagnant Indian agriculture, this “micro concept” of using honey bees for planned pollination of crops has the potential “macro-economic” impact.

Contribution of major insect pollinators in crop pollination



A decline in pollinating insects in India is resulting in reduced yields and could limit people's access to a nutritional diet. Indian researchers said there was a "clear indication" that pollinator abundance was linked to productivity. Loss of the natural service could have a long-term impact on the farming sector, which accounts for almost a fifth of the nation's GDP. Maintaining pollination services to assure present and future food production is currently a major challenge in the design of sustainable agro-ecosystems. Conservation of pollinators has become crucial for advancing United Nations Sustainable Development Goals.

Evidence for decline in pollinators

Pollinator populations have declined to levels that cannot sustain their pollination services in both agro-ecosystems and natural habitats, due to following causes:

- Indiscriminate use of pesticides
- Habitat fragmentation
- Intensified cultivation practices
- Climate change
- Lack of floral diversity
- Urbanization
- Human disturbance
- Competition from non-native species
- Problem of diseases, predators & parasites
- Microwave radiation from mobile towers

There have been declines throughout Europe of **wild bee** and **hoverfly** (Keil *et al.* 2011). Extinctions, reduced abundance, and range contractions of **butterfly** and species have occurred across the Northern Hemisphere. Wild, feral, and managed honey bees have declined over the past few decades in Europe and North America, although managed honey bees have increased

elsewhere. Threats in tropical regions are real and pressing, but data on insect pollinator declines are sparse

Unlike the western countries, the bees that pollinate Indian crops are almost all wild honey bees and other non- *Apis* pollinators. As a result, very little research has been done on their decline. More than 40% of honey bees have been disappeared during last 25 years in India. However, this is only reliable data on decline on honey bees in India and the fate of other wild pollinators is unknown.

NEED TO KNOW THE PERCEPTION OF FARMERS ON IMPORTANCE OF POLLINATION AND POLLINATORS

- In recent years, several studies have reported important declines of different pollinator taxa, including reductions in the abundance and diversity of wild bees, mainly attributed to **anthropogenic drivers** such as **habitat fragmentation, agricultural intensification, and climate change**.
- The intensification of agricultural landscapes in particular has reduced habitat diversity and availability, which threatens wild bee populations that are strongly dependent on natural and semi-natural habitats. Where ‘Red Lists’ of Endangered Species are available, it has been estimated that more than 40% of wild bee species could be threatened. Understanding farmers’ perceptions of the role of pollinators and the practices adopted to promote them is essential and highly relevant to influence the way farmers manage their farms and participate in the implementation of agri-environmental measures.
- Farmers’ perceptions were investigated in order to harness their knowledge in the participatory development of **conservation strategies** of pollination services.
- Sustainable agroecosystems should support **biodiversity conservation and food production**, and incorporation of farmers’ local knowledge and perceptions is essential to achieve both goals.
- As farmers are the ultimate managers of the agricultural landscape at the local and regional scale, it is essential to understand their perceptions to design **innovative and sustainable solutions** applied from a science– management–practice perspective.

- To make Government – **Strengthen the extension department** and giving continual **training** to the farmers on pollination and pollinators’ importance, its role, impacts of deforestation and chemical use, and why **conserve insects**. Continuing **curriculum based education** to strength future farmer’s capacity on pollination and the importance of insect pollinators.

Comparative analysis - perception of farmers on importance of pollination and pollinators:

- A comparison is done between two research studies to know the perceptual differences existing among the farmers on importance of pollination and pollinators.
- The two studies chosen are

1) *“Do farmers care about pollinators? A cross-site comparison of farmers’ perceptions, knowledge, and management practices for pollinator dependent crops”.*

2) *“Perception of farmers on importance of insect pollinators in gozamin district of Amhara Region, Ethiopia”.*

Study 1:

“Do farmers care about pollinators? A cross-site comparison of farmers’ perceptions, knowledge, and management practices for pollinator dependent crops”

In this research study, overall **92.7%** of the respondents recognized that pollinator insects are **necessary for food production**, ranging from 88% in farmers of sunflower to 95% in farmers of mixed-fruit orchards.

- 73.4% of the respondents perceived that pollinators have declined in their farms , ranging from 58.2% of respondents in mixed fruit orchards to 82.5% in sunflower crops.
- Farmer’s perception on the beneficial and harmful effects of different agricultural practices was found highly consistent.
- **Beneficial agricultural practices**
- Sowing of melliferous flora (97.15% of respondents)

- Maintenance of wildflowers within fields (94.6% of respondents)
- Conservation of natural or semi natural field edges (85.2% of respondents)
- Crop rotations (77.2% of respondents)
- Fallow fields (60% of respondents)
- **Harmful agricultural practices**
- Insecticide spraying (97.7%) and
- Monocultures (90%) were considered to be the most harmful practices for pollinators, followed by the use of hybrid transgenic varieties (83%)

Study 2:

“Perception of farmers on importance of insect pollinators in gozamin district of Amhara Region, Ethiopia”

In this research study , more than half of the respondents (60.7%) perceived that they do not want to increase insect pollinator diversity in their farmland.

- Farmers raised different perception about why they were not interested to increase pollinators; for instance,
 1. Insect feeding reduces **productivity** (18%),
 2. they didn’t know the importance of insect pollinators (18%),
 3. 19.7% perceived **no use** for the crop, and
 4. 1.6% believed that pollinators **attract crop pests**.
 5. The respondents (75%) also perceived that the presence of honey bees benefit beekeeper but not the community.

REASONS FOR THE DIFFERENCES IN PERCEPTION :

- Knowledge level of the respondents

- Past Experiences of the respondents
- Education
- Extension agency contact
- Do not consider the eco-system services.

COMMON AGRICULTURAL POLICY (EUROPE)

- The Common Agricultural Policy (CAP) was designed to support European farmers and ensure Europe's food security (1962). Resilient and sustainable agricultural sector and socio-economic equality. 2014 **-Ecological Focus Areas** (EFA's) enhancing the ecological function of agricultural landscapes. A clear mismatch between EFA design and implementation has been extensively reported. Incorporating farmers' perceptions into the 2021–2027 CAP agenda is fundamental, as farmers will be key and active actors in developing new strategies to focus investments toward the efficient delivery of pollination services in agricultural landscapes.

Global Pollinator Initiatives for Restoration of Pollinators:

During 5th meeting of Conference of Parties of the Convention on Biological Diversity held at Sao Paulo, in 1995, a decision was taken to establish an International Initiative for the Conservation and Sustainable Use of Pollinators (also k/a IPI, facilitated and coordinated by FAO)

The action plan for the initiative included following major areas:

- Address the lack of taxonomic information on pollinators
- Monitor pollinator decline, its causes and its impact on pollination services
- Assess the economic value of pollination & economic impact of the decline of pollination services
- Promote the conservation, restoration & sustainable use of pollinator diversity in agriculture & related ecosystems

IPI includes a project involving 7 nations (including India) with the aim of identifying practices & building capacity in the management of pollination services

Developed countries

- North American Pollinator Protection Campaign
- Brazilian Pollinator Initiative
- Canadian Pollinator Conservation
- European Pollinator Initiative

Developing countries

- African Pollinator Initiative
- Pollinator Conservation Action Plan for Sri Lanka

✓ **No such actions were taken to conserve pollinators in India**

International Pollinator Initiative (Action Plan for 2018-2030)

13th meeting of Conference of the Parties to the CBD held in Cancun, Mexico in 2016. It includes four elements as follows:

Element 1: Enabling policies and strategies

Element 2: Field-level implementation

Element 3: Civil society and private sector engagement

Element 4: Monitoring, Research and Assessment

Ele. 1-Enabling policies and strategies

Safeguard and promote wild and managed pollinators into the broader policy agendas focused on sustainable development

- Develop & implement coherent & comprehensive policies across sectors & across cross-cutting issues (e.g. biodiversity, chemicals & pollution, poverty reduction, climate change, disaster risk reduction & combat desertification)
- Address linkages between human health, nutritious diets and pesticide exposure

- Recognize pollinators and pollination as part of holistic farming systems and as an important agricultural input
- Apply nature-based solutions & reinforce positive interactions (e.g. IPM, on-farm diversification, ecological intensification)
- Support access to data and use of decision support tools, including land-use planning and zoning, to enhance the extent and connectivity of pollinator habitats in the landscape, with the participation of farmers and local communities
- Support the development of capacity to provide guidance on pollinator & pollination best management practices by supporting the incorporation of nature-based solutions into extension services, farmer to farmer sharing, and farmer researcher networks
- Develop & implement incentives for farmers & food system suppliers to encourage the adoption of pollinator-friendly practices (e.g. carbon sequestration measures that increase pollinators habitat; management of uncultivated areas for pollinator forage) and remove/reduce bad incentives harmful to pollinators and to their habitats (e.g. pesticides subsidies; incentives for pesticide use as credit requirements from banks), taking into consideration the needs of farmers, beekeepers, land managers, indigenous people and local communities and other stakeholders

Implement effective pesticide regulations

- Phase out existing harmful pesticides & agricultural chemicals, and avoid the registration of those that are harmful to pollinators
- Improve risk assessment procedures for pesticides, pesticide-coated seed, and living modified organisms to take into account possible impacts and cumulative effects, including sub lethal and indirect effects, on wild and managed pollinators, as well as other non-target species;
- Strengthen pesticide regulation authorities in their capacity to protect pollinators from agricultural chemicals

- Develop and promote guidance on best practices for pesticide use (e.g. techniques, technology, timing, non-flowering crops, weather conditions) based on International Code of Conduct on Pesticide Management of FAO & WHO
- Develop & implement national & regional pesticide risk reduction strategies and promote alternative approaches (e.g. IPM practices & biocontrol) to reduce or eliminate exposure of pollinators to harmful pesticides

Protect and promote traditional knowledge

- Protect & promote traditional knowledge, innovations & practices (e.g. traditional ways of understanding of parasite impacts) & support participatory identification of new species and monitoring.
- Protect established land rights & tenure for the conservation and sustainable use of pollinators.

Control the trade and movement of managed pollinators, and other trade-related impacts

- Monitor the movement of managed pollinator species, sub-species & breeds among countries & within countries.
- Develop mechanisms to limit the spread of parasites and pathogens to manage wild pollinator populations.
- Prevent & minimize the risk of introducing invasive alien species harmful to pollinators and to plant resources on which they depend.

Ele.2: Field-level Implementation:

Co-design (with farmers, beekeepers & land managers) & implement pollinator-friendly practices in farms & grasslands

- Create uncultivated patches of vegetation & enhance floral diversity using mainly native species & extend flowering periods to ensure diverse, abundant & continuous floral resource for pollinators.
- Foster networks for exchanges of native seeds.

- Promote genetic diversity & its conservation within populations of managed pollinators.
- Promote extension services to enhance their knowledge & provide hands-on education & empowerment of local farming communities.
- Diversify farming systems to make available food resources & habitats of pollinators through crop rotations, intercropping, home gardens, agroforestry, organic agriculture, & agroecology.
- Promote adoption of best practices for pesticide usage in the context of on-farm pollinator management (e.g. weed management strategies, IPM, biocontrol, pesticide application timing, weather conditions, equipment calibration in order to reduce spray drift to off-field areas).
- Promote best practices for climate-resilient agriculture for benefits with pollinators.

Address pollinator-friendly management & pollinator needs in forestry

- Minimize deforestation & other threats that impact negatively on wild pollinators and on traditional bee keeping.
- Promote agroforestry & forestry systems to ensure heterogeneous habitats formed by native species, which offer diversified floral and nesting resources for pollinators.

Promote connectivity, conservation, management and restoration of pollinators habitats

- Preserve or restore pollinator & habitat distributed in natural areas including forests, grasslands & agricultural lands, urban areas and natural corridors.
- Identify priority areas & measures, on global, regional, national and local levels for the conservation of rare and endangered pollinator species.
- Manage & restore grasslands & rangelands to enhance the availability of floral resources & nesting sites over time and space.
- Promote establishment & pollinator-friendly management of nature protection areas & semi-natural areas.

Ele.3: Civil society and private sector engagement

General public awareness raising

- Engage in awareness raising with targeted key stakeholder groups, including farmers, extension workers, beekeepers, NGOs, and consumer organisations
- Raise awareness among private sectors on the risks posed by pollination service decline to their business and the value of protecting pollinators
- Build taxonomic capacity for the general public to identify and differentiate pollinators from pests
- Support campaigns & activities to engage stakeholders in the conservation & sustainable use of pollinators, including celebrations of World Bee Day on 20th May
- Promote educational activities with children & students on the importance of pollinators & ecosystem functions & services in their daily lives & propose ways to contribute to pollinators protection
- Integrate pollinators & ecosystem services subjects into the curriculum of agriculture courses & universities programmes
- Support citizen science projects for generating data on pollinators & pollination & raising appreciation among civil society for the role of pollinators
- Encourage network building activities, viz., conferences, web portals, social media & information networks that facilitate access to all relevant stakeholders

Business and supply chain engagement

- Provide decision making tools to assist different stakeholders to assign values of pollinators & pollination
- Develop modalities to incorporate pollinators and pollination in true cost accounting of agriculture and food production

- Share evidences on pollination deficit and the economic impacts to support business in identify potential risks, developing vulnerability assessments, and adopting pollinator-friendly measures
- Develop and share pollinator friendly business cases for action

Ele.4: Monitoring, Research and Assessment:

Monitoring:

- Develop, implement & enhance monitoring of the status and trends of all pollinators
- Identify potential pollination deficits
- Monitor agricultural land & land use change to assess the most important threats to pollinators
- Promote pollinators and pollination as indicators for the status of biodiversity, ecosystem health, agriculture productivity and sustainable development

Research:

- Socioeconomic & environmental implications on pollinators decline.
- Impacts of pesticides considering their possible cumulative effects on pests and pollinators under different climatic conditions.
- Impact of IPM, pollination and pollinators.
- Translate pollinator research & findings into recommendations for specific practices.
- Strengthen the synergies between scientific evidence, conservation practices and farmer-researcher community practices.

Assessment

- Provide detailed national/regional/local datasets & visual maps to indicate the status of pollinators & pollination

- Assess the benefits of pollinators & pollination, taking into account the economic value to agriculture & private sectors
- Increase understanding of consequences of pollinator decline in specific crops, agro-ecosystems & natural environments
- Promote regular assessments of conservation status of pollinator species from different taxonomic groups, to update regularly national, regional & global red data books

Institutional role in changing the perception of farmers in regard to pollination and pollinators

The Ministry of Agriculture, Govt. of India launched a Central Sector Scheme titled 'Development of Beekeeping for Improving Crop Productivity' during the VIII plan (1994-95)

- The scheme had various components covering R&D, production & **distribution of honey bee colonies, organizing trainings and awareness programmes** and support for setting up **honey processing plant**, etc.

Bee Keeping Scheme:

In order for **pollination support to horticultural crops**, GOI provides assistance in Bee keeping under **Mission for Integrated Horticulture (MIDH)** scheme.

- There is also provision to take up specific project proposal on Bee Keeping under Rastriya Krishi Vikash Yojana (RKVY) as per cost norms and pattern of assistance as prevailing under MIDH.

NATIONAL BEE BOARD:

The Ministry of Agriculture, Govt. of India launched a Central Sector Scheme titled 'Development of Beekeeping for Improving Crop Productivity' during the VIII plan (1994-95). The scheme had various components covering R&D, production & distribution of honey bee colonies, organizing trainings and awareness programmes and support for setting up honey processing plant, etc. A Beekeeping Development Board also functioned under the Chairpersonship of Secretary (A & C) to coordinate the Beekeeping activities. The Scheme was approved for continuation during the IX Plan. However, the scheme got subsumed under the Macro Management Scheme, with effect from October, 2000. The Department facilitated efforts

by providing seed money through Small Farmers' Agri-Business Consortium (SFAC) for enabling the private sector to join hands in forming the National Bee Board as a Registered Society under Societies Registration Act, XXI of 1860 on 19th July, 2000 & promoted by the Small Farmers' Agri-Business Consortium (SFAC). In May 2005, Beekeeping has been included as a supplemental activity under National Horticulture Mission (NHM) for promoting cross pollination of Horticultural Crops.

KVIC:

To explore the possibilities to create employment in Tribal regions and Left Wing Affected areas, Backward Districts of the country and announced to take up mass honey production as Sweet Kranti (Sweet Revolution) in the lines of "Shwate Kranti" (White Revolution) in Mission mode. In response to that, Ministry of h, {SME in-principle approval / sanction of Rs. 49.78 Crores in favor of KVIC for Honey Mission with the aims to provide sustainable employment and income to rural & urban unemployed youth, both educated & uneducated, men & women by conserving the honeybee habitat and tapping untapped natural resources.

Objectives:

- a. Create an end-to-end implementation framework for beekeeping skill development, which provides employment opportunities and income generation to agriculturists, beekeepers rural & urban unemployed youth.
- b. Enforce nationally acceptable standards of Good Beekeeping Practices (GPB) in the country.
- c. Develop a network of quality master trainers in the field of beekeeping for imparting Good Beekeeping / Apicultural Practices.
- d. Offer a passage for overseas market for hive products.
- e. Enable pathways from novice beekeepers to viable commercial beekeeping by handholding to credit linkages.
- f. Promote convergence and co-ordination between all the stakeholders of beekeeping in India.

ICAR through AICRP on honeybees and pollinators:

All India Coordinated Research Project on Honey bees and Pollinators is a flag ship project of Indian Council of Agricultural Research started way back in 1981 based on the recommendations of National

Commission on Farmers in 1976. The project Coordinating Unit was initially located at Central Bee Training and Research Institute, Pune and only five centers associated with the project. Presently, the project is functioning with 18 regular cooperating centers and 6 voluntary centers located across the country. Project Coordinating Unit was shifted from CCS Haryana Agricultural University to Indian Agricultural Research Institute during 2013 for better administration and coordination with ICAR headquarters. Since its inception, the project has contributed immensely for the promotion of scientific bee keeping in the country by conducting systematic need based research on Honey bees and other pollinators. One of the major contributions of the project was introduction and spread of *Apis mellifera* bee keeping to different parts the country for increased honey and hive products production.

SUCCESS STORY under AICRP on Honeybees and Pollinators in Karnataka state:

- **Name of the farmer:** Anand
- **Crop:** pomegranate
- **Farm holding:** 2 acres.

Five bee hives are installed in area of two acres (pomegranate).the yield increase was found to be 55% in the year 2019-2020. Income from the farm raised to 21 lakhs/annum from 12 lakhs/annum.

RESEARCH STUDIES:

Study 1:

Farmers' perceptions of pollinators' importance in coffee production in Uganda.

Theodore Munyuli

This study survey was conducted in the banana-coffee system of Lake Victoria Arc in central Uganda with **Sample size – 120 (male-60, female-60), Study sites – 26, Year of conduct -2011.**

Gender	Number of respondents(%)						
Variables	Males	% Males	Females	% Females	χ^2 -test	All respondents	All (%)
(A): Respondents knowledge of insect groups frequently seen visiting coffee blossoms (flowers)							
1. Apini-Meliponini	10	16.7	20	33.3	5.6 *	30	25.0
2. Ceratinini-Megachilini	0	0.0	0	0.0	NT	0	0.0
3. Anthophorini-Xylocopini	2	3.3	2	3.3	NT	4	3.3
4. Honeybee (Apini) + Pests	2	3.3	0	0.0	3.3 ns	2	1.7
5. Honey bees + non-pests	25	41.7	6	10.0	19.4 ***	31	25.8
6. Butterflies/Moths	2	3.3	9	15.0	7.4 **	11	9.2
7. Wasps/Ants	0	0.0	4	6.7	6.7 *	4	3.3
8. Flies	7	11.7	2	3.3	4.6 *	9	7.5
9. Halictini-Eucerini	0	0.0	0	0.0	NT	0	0.0
10. Thrips/Beetles	3	5.0	3	5.0	NT	6	5.0
11. Other pests	4	6.7	4	6.7	NT	8	6.7
12. Do not know	5	8.3	10	16.7	2.8 ns	15	12.5

(C): Are you aware that some insects listed above as flower visitors/pests of coffee crops are beneficial (e.g. as food, predators, parasitoids, pollinate crops, or make the soil to be more fertile and productive)?

1. None is beneficial	20	33.3	10	16.7	5.6 *	30
2. They are pests	12	20.0	30	50.0	12.9 ***	42
3. I do not know	23	38.3	20	33.3	0.4 ns	43
4. Some are beneficial	5	8.3	0	0.0	8.3 **	5

(F): Do you think bees and or other pollinators may play important role in coffee fruit set and yield increase?

1. Yes it very Important	5	8.3	1	1.7	4.5 *	6
2. Not important at all	30	50.0	7	11.7	23.8 ***	37
3. They are just there	20	33.3	30	50.0	3.3 ns	50
4. Do not know	5	8.3	22	36.7	17.8 ***	27

(G): Knowledge of effects of herbicides/insecticides: are you aware that they do killing honeybees/wild bees?

1. Herbicides	1	1.7	0	0.0	NT	1
3 Insecticides	4	6.7	1	1.7	3.1 ns	5
3. Do not know	55	91.7	59	98.3	0.24 ns	114

(K): Do you believe that placing beehives in your field can increase your coffee yield in addition to the honey?

1. Do not believe	45	75.0	0	0.0	75 ***	45
2. I believe	2	3.3	2	3.3	NT	4
3. Do not know	13	21.7	58	96.7	47.6 ***	71

Conclusions of the study:

- Differences in perceptions and knowledge of pollination constitute a major obstacle in farmer–researcher cooperation and collaboration.
- Findings from this study also indicated that, that more than 90% of the farmers were not aware of the role played by bees in the increase of coffee yield.

Study 2:**FARMERS PERCEPTION ON EFFECT OF PESTICIDE ON INSECT POLLINATORS AT PADAMPUR AND JUTPANI VDCS, CHITWAN, NEPAL.**

A survey was conducted to know the farmers perception on the effect of chemical pesticide on insect pollinators at Jutpani and Padampur VDCs, Chitwan, Nepal in 2013. Thirty households were randomly selected and semi-structured questionnaire was used to collect necessary information by face-to-face interview. Majority of the farmers (60%) applied pesticides on crops during mid-day. Half of the farmers (50.00%) ranked population decline as effect of pesticide on pollinators, some farmers (16.67%) also observed dead pollinators in field and hives, affecting their distribution (13.33%) and repelling them from field as mentioned by the respondents (13.33%). Majority of respondents (56.67%) perceived that misuse and overuse of chemical pesticide was the major cause of declining insect pollinators, among other causes, 16.67% farmers replied deforestation, 10.00% environmental pollution and 6.67% less cultivated area responsible for the decline. Very few farmers (6.67%) could realise the incidence of disease on pollinator due to pesticidal effects.

Perception of farmers on reason for decreasing insect pollinators in Jutpani and Padampur VDCs in Chitwan, 2013 (n=30)

Reason of decreasing insect pollinators	Frequency	Percentage
Misuse of chemical pesticide	17	56.67
Deforestation	5	16.67
Environmental pollution	3	10.00
Less cultivated land	2	6.67
<i>Apis mellifera</i> L. replace other insect pollinators	1	3.33
Killing <i>Apis dorsata</i> by burning for honey	1	3.33
Increase in incidence of pest and diseases	1	3.33
Total	30	100

Conclusion of the study :

- Surveyed reports showed that farmers were not aware on negative effect of chemical pesticide on insect pollinators. But, majority of farmers agreed on declining of insect pollinators. For this, misuse of chemical pesticide was the major cause on decline of insect pollinators.

❖ **CONCLUSION:**

To meet out the healthy-nutritious food requirement to ever-multiplying population, production of agriculture produces shall have to be maximized through integration of numerous approaches, of which, pollination management system is considered major one for which conservation & restoration of insect pollinators is highly required. Differences in perceptions and knowledge of pollination constitute a major obstacle in farmer–researcher cooperation and collaboration which is necessary to be bridged down for sustainable management of pollination services in rural farmlands.

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DISCUSSION:

1. What is the role of KVIC in terms of pollinators?

Create an end-to-end implementation framework for beekeeping skill development, which provides employment opportunities and income generation to agriculturists, beekeepers rural & urban unemployed youth. Enforce nationally acceptable standards of Good Beekeeping Practices (GPB) in the country. Develop a network of quality master trainers in the field of beekeeping for imparting Good Beekeeping / Apicultural Practices. Offer a passage for overseas market for hive products. Enable pathways from novice beekeepers to viable commercial beekeeping by handholding to credit linkages. f. Promote convergence and co-ordination between all the stakeholders of beekeeping in India.

2. Why honey bees are only promoted why not other pollinators?

The reason behind the promotion of honeybees more than other pollinators id that it would attract the farmers by providing additional income in terms of honey, bee wax and other products so indirectly which also helps in increasing in production and productivity of crop along with the quality of crop.

3. How principles of perception can be applied in extension?

Taking an example of principle of context, the extension agent should work according to the situation which is based on environment, values, culture of the people with whom he is working. If he starts explaining the techniques of rearing of piggery to the Muslim community it would be of no use as it is against their cultural values. So before demonstrating or taking up any programme extension agent should consider the perception of the individuals in regard to the programme that he wants to introduce.

4. Is there any training programme in Apiculture department of UAS-B and who will fund them?

There are training programmes being conducted by the Apiculture dept. for maximum of 50 members once in a month and the funding sometimes be from AICRP and sometimes it will be a self-funding programme.

5. Are there any state initiatives especially to conserve pollinators?

As such there are no initiatives taken by the Karnataka government specially to conserve the pollinators.

6. What would be the role of line departments to conserve pollinators?

Taking up the programmes to create awareness and demonstrating the advantages of conserving and increased population of pollinators by bringing the success stories of farmers who realized the profits in this regard could be done.

7. What is the difference between perspective and perception?

Perspective is the way you look at something (your opinion) whereas Perception means the interpretation and understanding of the information received from your senses.

8. Are there any training programmes being conducted for conservation of pollinators to the farmers?

There are training programmes conducted to increase the honey production as its main motto but as such no training programmes were conducted to make farmers aware about the conservation strategies of pollinators and pollination.

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Name: Marepally Udaya Sindhu
 ID. No: PALB 9158
 Class: Sr. M.Sc.

Date: 15-01-2021
 Time: 2.00 PM
 Venue: Dwarakinath hall

Seminar I

“perception of farmers on importance of pollination and pollinators in agricultural production”

Synopsis

A pollinator is the biotic agent, animal or vector which moves pollen from anthers of a flower to the stigma of another or same flower to accomplish fertilization of a flower. Pollination is a key process in seed and fruit formation, making it a critical determinant in food production. In addition, they benefit by increasing food production, food security that in turn improve livelihoods and play a great role in conserving biological diversity in agricultural and natural ecosystems. Insect pollinators contribute to the productivity of more than 75 per cent of important crop species (Klein *et al.*, 2007). Direct contribution of insect pollination to Indian agriculture is staggering Rupees 1,12,615.73 crores (USD 22.52 billion) annually, representing 8.72 per cent, besides spill over benefits of increase in quality traits, seed production, breeding efficiency, etc. For stagnant Indian agriculture, this “micro concept” of using honey bees for planned pollination of crops has the potential “macro-economic” impact. Thus, conservation of pollinators has become crucial for advancing United Nations Sustainable Development Goals. Understanding farmers’ perceptions on the role of pollinators and the practices adopted to promote them is essential and highly relevant to influence the way farmers manage their farms and participate in the implementation of agri-environmental measures. Keeping these aspects in view, the present seminar has been conceptualized with the following objectives.

4. To understand the concept of perception.
5. To know the perception of farmers on importance of pollination and pollinators in agricultural production and institutional role to change the perception of the farmers.
6. To review the related studies.

Concept of perception

Perception refers to way we understand the world around us. People respond to the situation based on perception of reality than the reality itself. Perception in communication determines how one will communicate and how they will receive information from another person. Because of different personalities, cultural differences or past experiences, what one person intends to communicate may be differently perceived by another. Some of the factors that influence perception and communication include self-perception, learned perception, environmental perception and cultural perception.

Perception of farmers on importance of pollination and pollinators

Farmers’ perceptions were investigated in order to harness their knowledge in the participatory development of conservation strategies of pollination services. As farmers are the ultimate managers of the

agricultural landscape at the local and regional scale, it is essential to understand their perceptions to design innovative and sustainable solutions applied from a science– management–practice perspective.

Initiatives to promote the perception of farmers

Incorporating farmers' perceptions into the 2021–2027 CAP agenda is fundamental, as farmers will be key and active actors in developing new strategies to focus investments toward the efficient delivery of pollination services in agricultural landscapes. During 5th meeting of Conference of Parties of the Convention on Biological Diversity held at Sao Paulo, in 1995, a decision was taken to establish an International Initiative for the Conservation and Sustainable Use of Pollinators. International Pollinator Initiative (Action Plan for 2018-2030) -13th meeting of Conference of the Parties to the CBD held in Cancun, Mexico in 2016.

Institutional role in changing the perception of farmers

- 1) Ministry of Agriculture 2) National Bee Board 3) KVIC 4) ICAR through AICRP on honeybees and pollinators 5) KVK's.

Research studies

Theodore (2011) concluded that knowledge on pollination were influenced by social, educational, cultural and individual attitudes of the respondents. It was also found that gender, general knowledge, age, level of education had no importance in knowledge with regard to pollination.

Pudasaini et al, (2016) elucidated that farmers noticed the decline in pollinators in their farms but could not know the reason behind it was the excessive spray of chemical pesticides. It was reported that 16.67% of respondents could find dead pollinators in their farms, 13.33% of respondents found pollinators repelling from their farms.

Conclusion

To meet out the healthy-nutritious food requirement to ever-multiplying population, production of agriculture produces shall have to be maximized through integration of numerous approaches, of which, pollination management system is considered major one for which conservation & restoration of insect pollinators is highly required. Differences in perceptions and knowledge of pollination constitute a major obstacle in farmer–researcher cooperation and collaboration which is necessary to be bridged down for sustainable management of pollination services in rural farmlands.

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PRESENTATION SLIDES

OBJECTIVES

- 1) To know the concept of Perception , Pollination and Pollinators.
- 2) To know the perception of farmers on importance of pollination and pollinators in agricultural production and institutional role to change the perception of the farmers.
- 3) To review related studies.

INTRODUCTION

Perception (from the [Latin](#) *perceptio*, meaning gathering or receiving) is the organization, identification, and interpretation of [sensory information](#) in order to represent and understand the presented information or environment.

- Perception refers to way we understand the world around us.
- Differs from person to person based on their needs, values and expectations
- People respond to the situation based on perception of reality than the reality itself.

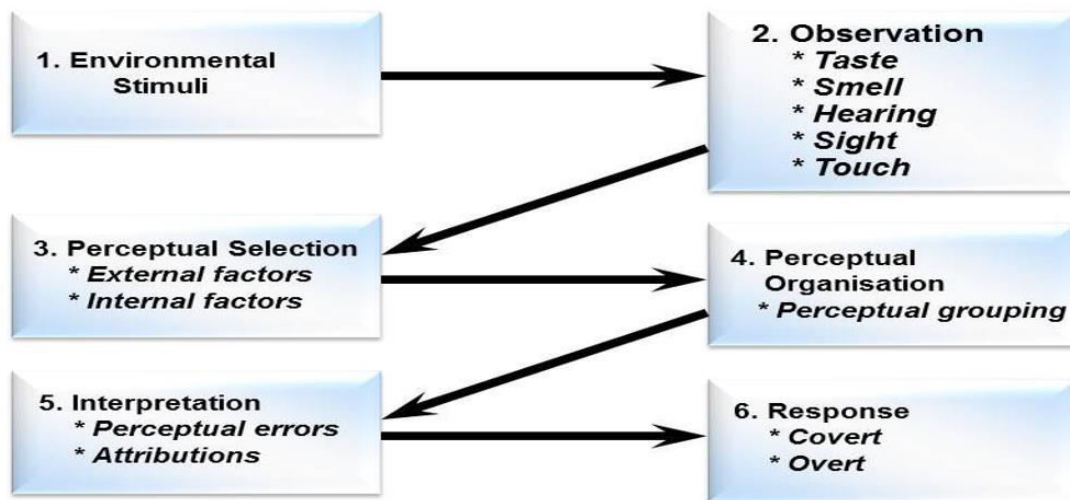


SENSATION versus PERCEPTION

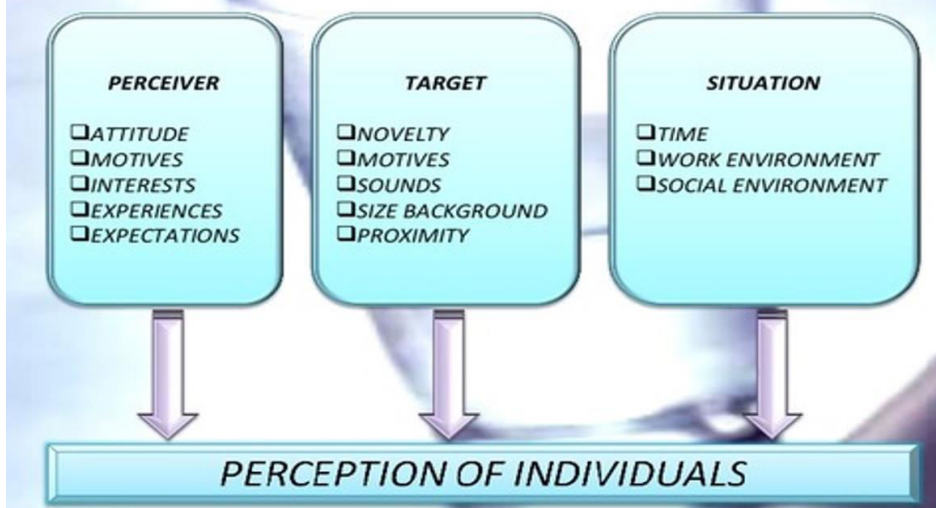
SENSATION VERSUS PERCEPTION

SENSATION	PERCEPTION
Process of receiving information via our five senses, which can then be experienced and interpreted by the brain	Process of interpreting the information acquired through the five senses accordingly
Source is the stimuli obtained from sensory organs	Source is the information sent to the brain through sensation
Results in perception	Results in interpreting and giving meaning to the information received
A general biological procedure	Has more psychological significance since the person's past experiences and ideologies affect directly
	Visit www.PEDIAA.com

The Perception Process



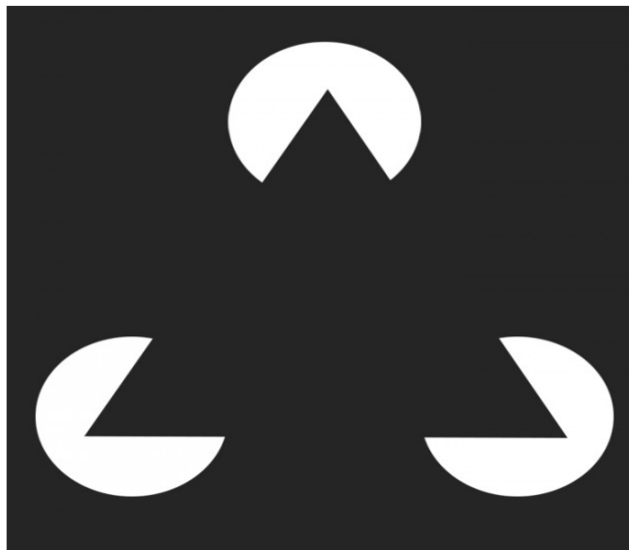
FACTORS INFLUENCING PERCEPTION



PRINCIPLES OF PERCEPTION

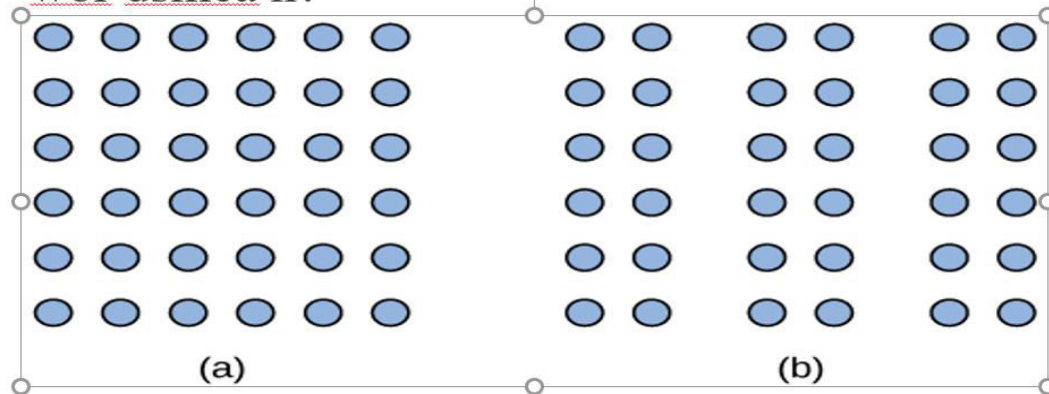
- Individuals tend to organize environmental stimuli into some meaningful patterns or whole according to some principles. Some of the important principles are:
- PRINCIPLE OF **FIGURE-GROUND RELATIONSHIP**
- PRINCIPLE OF **CLOSURE**
- PRINCIPLE OF **GROUPING**
- PRINCIPLE OF **SIMPLICITY**
- PRINCIPLE OF **CONTOUR**
- PRINCIPLE OF **CONTEXT**
- PRINCIPLE OF **CONTRAST**

Principle of closure.



Principle of grouping.

- Can you make sense of this sentence? What does it mean?



Principle of figure ground relationship.



Principle of simplicity.

Simplicity

People will perceive and interpret ambiguous or complex images as the **simplest forms possible.**

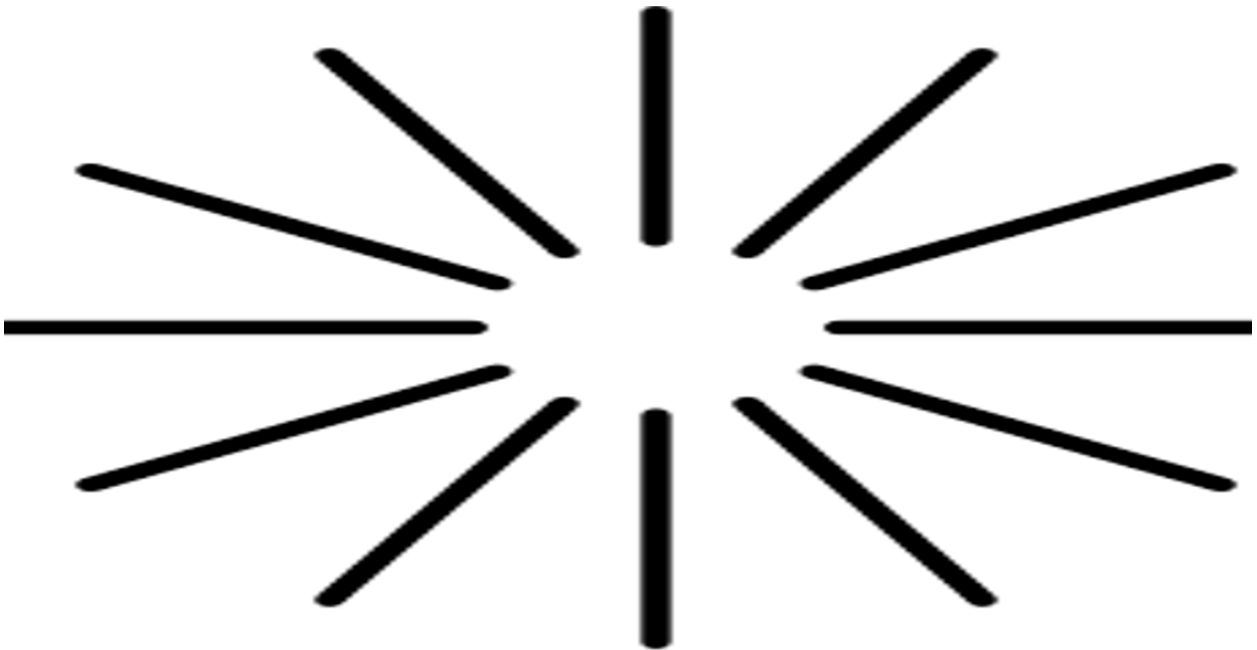
Before



After



Principle of contour.

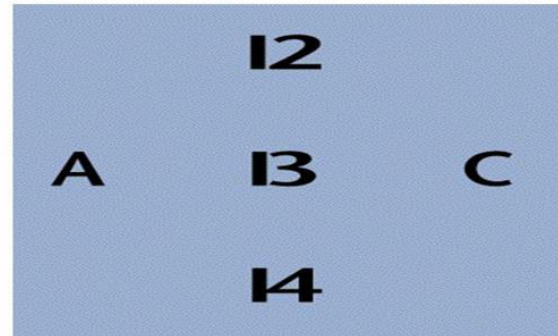


Principle of context.

Perceptual Set

- The same physical stimulus can be interpreted differently depending on perceptual set, e.g., context effects.
- When is the middle character the letter B and when is it the number 13?

Context Effects



Principle of contrast.



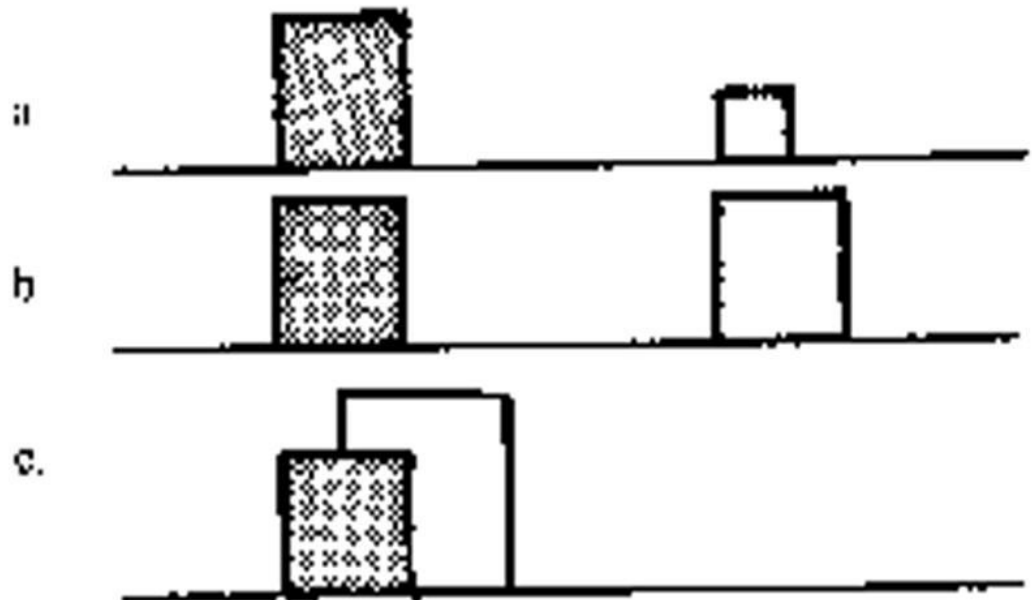
TYPES OF PERCEPTION.

- **DEPTH PERCEPTION**
- **DISTANCE PERCEPTION**
- **MOTION PERCEPTION**
- **FORM PERCEPTION**

Depth perception.

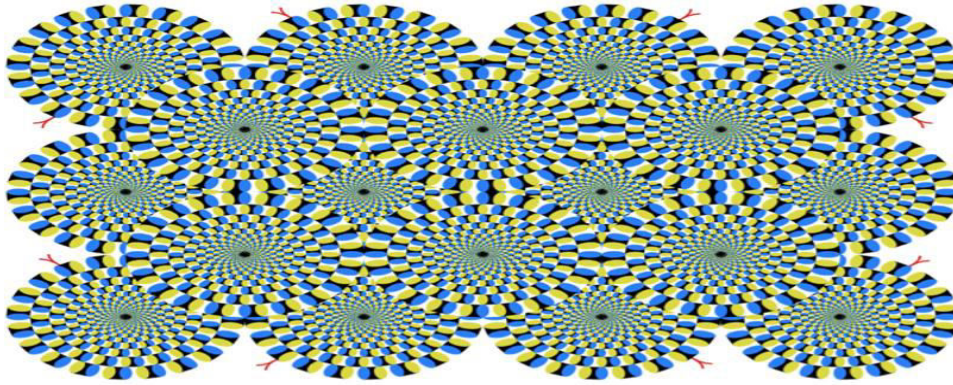


Distance perception.

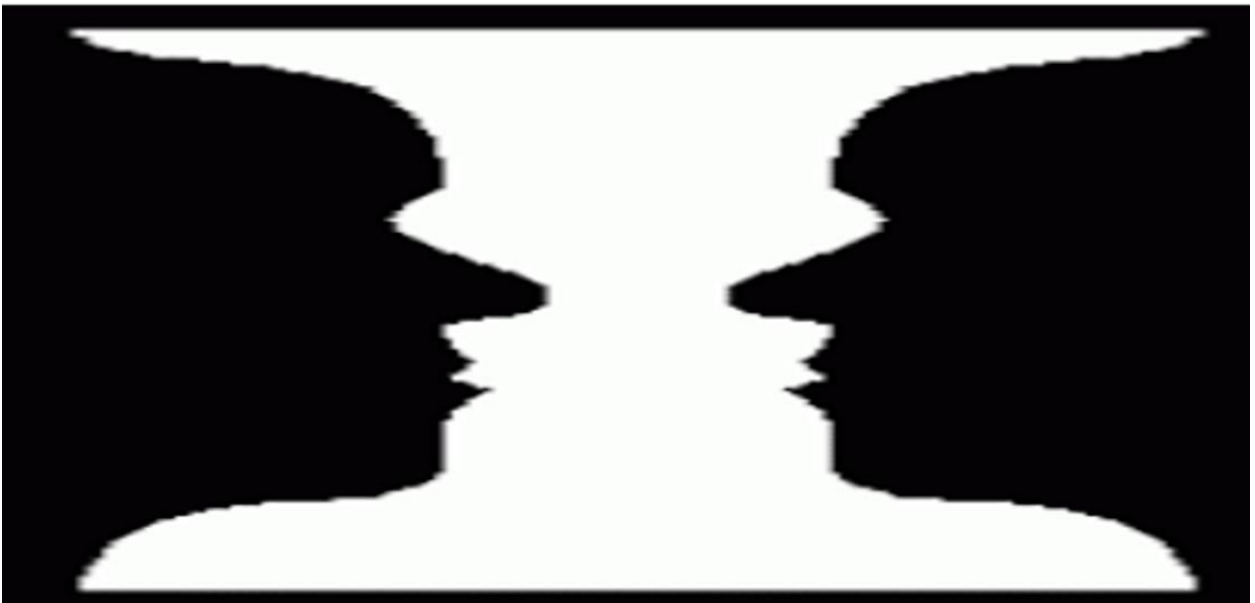


Two of the cues illustrated in question 1 are:

Motion perception.



Form perception.

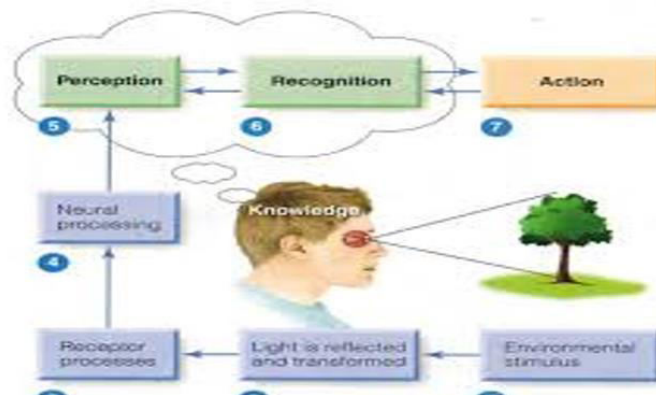


The importance of knowledge in the perceptual process

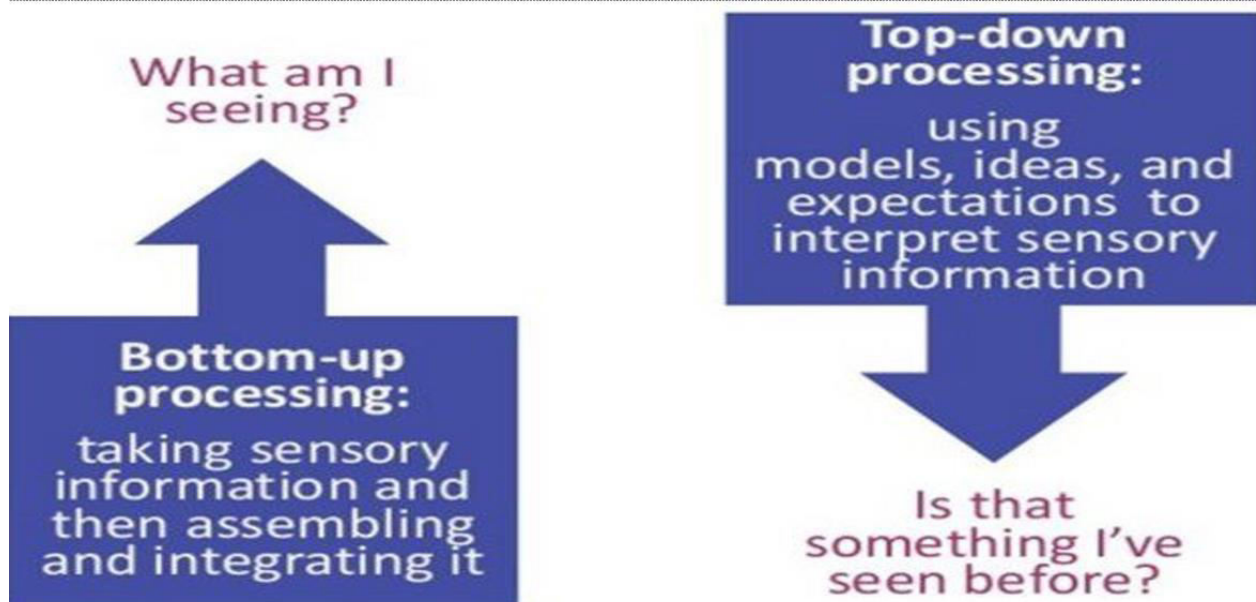
Any information brought by the perceiver to a perceptual situation

Particularly strong effect on the recognition

TOP-DOWN vs BOTTOM-UP processing



The importance of knowledge in the perceptual process



The importance of knowledge in the perceptual process



The importance of perception in communication process

When you communicate with someone, you convey a message that the other person is meant to perceive and decode.

The simpler and **more straightforward** the message, the **easier** it is to perceive.

In any type of communication, there's always the chance that the intended meaning is lost in the communication.

Because of different **personalities, cultural differences or past experiences**, what one person intends to communicate may be differently perceived by another.

Some of the factors that influence perception and communication include **self-perception, learned perception, environmental perception and cultural perception.**

The importance of perception in communication process

Perception plays an important role in **communication**.

Our **perceptions** help form, challenge, and reinforce our ideas, values, and beliefs, which then **influence** how we choose to **interact with others**.

Perception will **help us** to **become an effective communicator** through evaluating all messages from all perspectives.

Example : Perception of colour **red**

Person with color blindness (no perception)

Person with normal vision (his interpretation)



Stop/Anger/Indebt (US)

Good fortune (china)

The importance of perception in communication process

- Perception in communication determines how one will communicate and how they will receive information from another person.
- Perception is influenced by
 - Physical elements** : what information can your eye can take.
 - Environmental elements**: what is the context in which information is being perceived.
 - Learned elements** : culture, personality, habits etc which will makes us to filter what we have selective perceive.

IMPORTANCE OF POLLINATION AND POLLINATORS

- A pollinator is the biotic agent, animal or vector which moves pollen from anthers of a flower to the stigma of another or same flower to accomplish fertilization of a flower.
- **Seed and fruit formation**
- **Valuable ecosystem services**
- **Food production and Food security**
- **Stability of crop production**

IMPORTANCE OF POLLINATION AND POLLINATORS

Pollinators	% contribution
Bees	73%
Flies	19%
Bats	6.5%
Wasps	5%
Beetles	5%
Birds	4%
Butterflies	4%

- Insect pollinators contribute to the **productivity of more than 75 per cent** of important crop species (Klein *et al.*, 2007), representing 35 per cent of the global crop production volume.
- Direct contribution of insect pollination to Indian agriculture is staggering **Rupees 1,12,615.73 crores** (USD 22.52 billion) annually, representing 8.72 per cent, besides spill over benefits of increase in quality traits, seed production, breeding efficiency, etc.
- For stagnant Indian agriculture, this **“micro concept”** of using honey bees for planned pollination of crops has the potential **“macro-economic” impact**.

**If we die, we're taking
you with us.**



**“If the bee disappears from the surface
of the earth, man would have no more
than four years to live.”**

~Albert Einstein

Are pollinators declining.....?



YES.....



The evidence for pollinator declines

- There have been declines throughout Europe of **wild bee** ([Biesmeijer et al. 2006](#)) and **hoverfly** ([Keil et al. 2011](#))
- Extinctions, reduced abundance, and range contractions of **butterfly** ([Warren et al. 2001](#); [Forister et al. 2010](#)) and **bumblebee** ([Williams and Osborne 2009](#); [Bommarco et al. 2011](#); [Cameron et al. 2011](#)) species have occurred across the Northern Hemisphere
- Wild, feral, and managed honey bees have declined over the past few decades in Europe and North America ([Potts et al. 2010b](#); [vanEngelsdorp et al. 2011](#)), although managed honey bees have increased elsewhere ([Aizen and Harder 2009](#))
- Threats in tropical regions are real and pressing, but data on insect pollinator declines are sparse ([Aizen and Feinsinger 1994](#); [Freitas et al. 2009](#))

NEED TO KNOW THE PERCEPTION OF FARMERS ON IMPORTANCE OF POLLINATION AND POLLINATORS

- In recent years, several studies have reported important declines of different pollinator taxa ([Biesmeijer et al., 2006](#); [IPBES, 2016](#); [Potts et al., 2010](#)), including reductions in the abundance and diversity of wild bees, mainly attributed to **anthropogenic drivers** such as **habitat fragmentation, agricultural intensification, and climate change** ([Biesmeijer et al., 2006](#); [Potts et al., 2010](#)).
 - The **intensification of agricultural landscapes** in particular has reduced habitat diversity and availability ([Tscharntke et al., 2005](#)), which threatens wild bee populations that are strongly dependent on natural and semi-natural habitats ([Saturni et al., 2016](#)).
 - Where ‘Red Lists’ of Endangered Species are available, it has been estimated that more than 40% of wild bee species could be threatened ([IPBES, 2016](#)).
 - Understanding farmers’ perceptions of the role of pollinators and the practices adopted to promote them is essential and highly relevant to influence the way farmers manage their farms and participate in the implementation of agri-environmental measures ([Herzon & Mikk, 2007](#); [Meijer et al., 2015](#); [Wilson & Hart, 2000](#)).
 - Farmers’ perceptions were investigated in order to harness their knowledge in the participatory development of **conservation strategies** of pollination services.
 - Sustainable agroecosystems should support **biodiversity conservation and food production**, and incorporation of farmers’ local knowledge and perceptions is essential to achieve both goals ([Rawluk & Saunders, 2019](#)).
 - As farmers are the ultimate managers of the agricultural landscape at the local and regional scale, it is essential to understand their perceptions to design **innovative and sustainable solutions** applied from a science– management–practice perspective.
-

- To make **Government** –
 1. **Strengthen the extension department** and giving continual **training** to the farmers on pollination and pollinators' importance, its role, impacts of deforestation and chemical use, and why **conserve insects**.
 2. Continuing **curriculum based education** to strength future farmer's capacity on pollination and the importance of insect pollinators.

Comparative analysis - perception of farmers on importance of pollination and pollinators

- A comparison is done between two research studies to know the perceptual differences existing among the farmers on importance of pollination and pollinators.
- The two studies chosen are
 - 1) *“Do farmers care about pollinators? A cross-site comparison of farmers’ perceptions, knowledge, and management practices for pollinator dependent crops”*
 - 2) *“Perception of farmers on importance of insect pollinators in gozamin district of Amhara Region, Ethiopia”*

Comparative analysis - perception of farmers on importance of pollination and pollinators

“Do farmers care about pollinators? A cross-site comparison of farmers’ perceptions, knowledge, and management practices for pollinator dependent crops”

In this research study , overall **92.7%** of the respondents recognized that pollinator insects are **necessary for food production** , ranging from 88% in farmers of sunflower to 95% in farmers of mixed-fruit orchards.

- **73.4% of the respondents** perceived that pollinators have **declined** in their farms , ranging from 58.2% of respondents in mixed fruit orchards to 82.5% in sunflower crops.
- Farmer’s perception on the beneficial and harmful effects of different agricultural practices was found highly consistent.

Comparative analysis - perception of farmers on importance of pollination and pollinators

- **Beneficial agricultural practices**

1. Sowing of melliferous flora (97.15% of respondents)
2. Maintenance of wildflowers within fields (94.6% of respondents)
3. Conservation of natural or semi natural field edges (85.2% of respondents)
4. Crop rotations (77.2% of respondents)
5. Fallow fields (60% of respondents)

- **Harmful agricultural practices**

1. Insecticide spraying (97.7%) and
2. Monocultures (90%) were considered to be the most harmful practices for pollinators, followed by the use of hybrid transgenic varieties (83%)

Comparative analysis - perception of farmers on importance of pollination and pollinators

• “Perception of farmers on importance of insect pollinators in gozamin district of Amhara Region, Ethiopia”

In this research study , more than half of the respondents (60.7%) perceived that they do not want to increase insect pollinator diversity in their farmland.

- Farmers raised different perception about why they were not interested to increase pollinators; for instance,
 1. Insect feeding reduces **productivity** (18%),
 2. they didn't know the importance of insect pollinators (18%),
 3. 19.7% perceived **no use** for the crop, and
 4. 1.6% believed that pollinators **attract crop pests**.

Comparative analysis - perception of farmers on importance of pollination and pollinators

- The respondents (75%) also perceived that the presence of honey bees benefit beekeeper but not the community.

• REASONS FOR THE DIFFERENCES IN PERCEPTION :

1. Knowledge level of the respondents
2. Past Experiences of the respondents
3. Education
4. Extension agency contact
5. Do not consider the eco-system services.

COMMON AGRICULTURAL POLICY (EUROPE)

- The Common Agricultural Policy (CAP) was designed to support European farmers and ensure Europe's food security (1962).
- Resilient and sustainable agricultural sector and socio-economic equality.
- 2014 - **Ecological Focus Areas** (EFA's) enhancing the ecological function of agricultural landscapes.
- A clear mismatch between EFA design and implementation has been extensively reported.
- Incorporating **farmers' perceptions** into the **2021–2027 CAP agenda** is fundamental, as farmers will be key and active actors in developing new strategies to focus investments toward the efficient delivery of pollination services in agricultural landscapes.

Global Pollinator Initiatives for Restoration of Pollinators

- During 5th meeting of Conference of Parties of the Convention on Biological Diversity held at Sao Paulo, in 1995, **a decision was taken to establish** an International Initiative for the Conservation and Sustainable Use of Pollinators (also k/a IPI, facilitated and coordinated by FAO)
- The **action plan for the initiative** included following major areas:
 - Address the lack of taxonomic information on pollinators
 - Monitor pollinator decline, its causes and its impact on pollination services
 - Assess the economic value of pollination & economic impact of the decline of pollination services
 - Promote the conservation, restoration & sustainable use of pollinator diversity in agriculture & related ecosystems

IPI includes a project involving 7 nations (including India) with the aim of identifying practices & building capacity in the management of pollination services

- Developed countries

- North American Pollinator Protection Campaign
- Brazilian Pollinator Initiative
- Canadian Pollinator Conservation
- European Pollinator Initiative

- Developing countries

- African Pollinator Initiative
- Pollinator Conservation Action Plan for Sri Lanka
- **No such actions were taken to conserve pollinators in India**

Institutional role in changing the perception of farmers in regard to pollination and pollinators

The Ministry of Agriculture, Govt. of India launched a Central Sector Scheme titled 'Development of Beekeeping for Improving Crop Productivity' during the VIII plan (1994-95)

- The scheme had various components covering R&D, production & **distribution of honey bee colonies, organizing trainings and awareness programmes** and support for setting up **honey processing plant**, etc.

Bee Keeping Scheme :

In order for **pollination support** to **horticultural crops**, GOI provides assistance in Bee keeping under **Mission for Integrated Horticulture (MIDH)** scheme.

Institutional role in changing the perception of farmers in regard to pollination and pollinators

- There is also provision to take up specific project proposal on Bee Keeping under Rastriya Krishi Vikash Yojana (RKVY) as per cost norms and pattern of assistance as prevailing under MIDH.
- **NATIONAL BEE BOARD**
- **KVIC**
- **ICAR through AICRP on honeybees and pollinators , KVK's.**

SUCCESS STORY

- **Name of the farmer :** Anand
- **Crop :** pomegranate
- **Farm holding :** 2 acres

- ❖ Five bee hives are installed in area of two acres (pomegranate).the yield increase was found to be 55% in the year 2019-2020.
 - ❖ Income from the farm raised to 21 lakhs/annum from 12 lakhs/annum

International Pollinator Initiative (Action Plan for 2018-2030)

- **13th meeting of Conference of the Parties to the CBD held in Cancun, Mexico in 2016**
- Element 1: Enabling policies and strategies
- Element 2: Field-level implementation
- Element 3: Civil society and private sector engagement
- Element 4: Monitoring, Research and Assessment

RESEARCH STUDIES

Farmers' perceptions of pollinators' importance in coffee production in Uganda .

Theodore Munyuli

- **Sample size – 120 (male-60, female-60)**
- **Study sites – 26**
- **Year of conduct -2011**

Gender	Number of respondents(%)							
Variables	Males	% Males	Females	% Females	χ^2 -test	All respondents	All (%)	
(A): Respondents knowledge of insect groups frequently seen visiting coffee blossoms (flowers)								
1. Apini-Meliponini	10	16.7	20	33.3	5.6 *	30	25.0	
2. Ceratinini-Megachilini	0	0.0	0	0.0	NT	0	0.0	
3. Anthophorini-Xylocopini	2	3.3	2	3.3	NT	4	3.3	
4. Honeybee (Apini) + Pests	2	3.3	0	0.0	3.3 ns	2	1.7	
5. Honev bees + non-pests	25	41.7	6	10.0	19.4 ***	31	25.8	
6. Butterflies/Moths	2	3.3	9	15.0	7.4 **	11	9.2	
7. Wasps/Ants	0	0.0	4	6.7	6.7 *	4	3.3	
8. Flies	7	11.7	2	3.3	4.6 *	9	7.5	
9. Halictini-Eucerini	0	0.0	0	0.0	NT	0	0.0	
10. Thrips/Beetles	3	5.0	3	5.0	NT	6	5.0	
11. Other pests	4	6.7	4	6.7	NT	8	6.7	
12. Do not know	5	8.3	10	16.7	2.8 ns	15	12.5	

(C): Are you aware that some insects listed above as flower visitors/pests of coffee crops are beneficial (e.g. as food, predators, parasitoids, pollinate crops, or make the soil to be more fertile and productive)?

1. None is beneficial	20	33.3	10	16.7	5.6 *	30
2. They are pests	12	20.0	30	50.0	12.9 ***	42
3. I do not know	23	38.3	20	33.3	0.4 ns	43
4. Some are beneficial	5	8.3	0	0.0	8.3 **	5

(F): Do you think bees and or other pollinators may play important role in coffee fruit set and yield increase?

1. Yes it very Important	5	8.3	1	1.7	4.5 *	6
2. Not important at all	30	50.0	7	11.7	23.8 ***	37
3. They are just there	20	33.3	30	50.0	3.3 ns	50
4. Do not know	5	8.3	22	36.7	17.8***	27

(G): Knowledge of effects of herbicides/insecticides: are you aware that they do killing honeybees/wild bees?

1. Herbicides	1	1.7	0	0.0	NT	1
3 Insecticides	4	6.7	1	1.7	3.1 ns	5
3. Do not know	55	91.7	59	98.3	0.24 ns	114

(K): Do you believe that placing beehives in your field can increase your coffee yield in addition to the honey?

1. Do not believe	45	75.0	0	0.0	75 ***	45
2. I believe	2	3.3	2	3.3	NT	4
3. Do not know	13	21.7	58	96.7	47.6 ***	71

❖ Conclusions of the study :

- Differences in perceptions and knowledge of pollination constitute a major obstacle in farmer–researcher cooperation and collaboration.
- Findings from this study also indicated that, that more than 90% of the farmers were not aware of the role played by bees in the increase of coffee yield.

➤ **FARMERS PERCEPTION ON EFFECT OF PESTICIDE ON INSECT POLLINATORS AT PADAMPUR AND JUTPANI VDCS, CHITWAN, NEPAL**

• **Sample size – 30 (male-60, female-60)**

• **Study sites – 2**

• **Year of conduct -2013**

Perception of farmers on reason for decreasing insect pollinators in Jutpani and Padampur VDCs in Chitwan, 2013 (n=30)

Reason of decreasing insect pollinators	Frequency	Percentage
Misuse of chemical pesticide	17	56.67
Deforestation	5	16.67
Environmental pollution	3	10.00
Less cultivated land	2	6.67
<i>Apis mellifera</i> L. replace other insect pollinators	1	3.33
Killing <i>Apis dorsata</i> by burning for honey	1	3.33
Increase in incidence of pest and diseases	1	3.33
Total	30	100

❖ Conclusion of the study :

- Surveyed reports showed that farmers were not aware on negative effect of chemical pesticide on insect pollinators.
- But, majority of farmers agreed on declining of insect pollinators.
- For this, misuse of chemical pesticide was the major cause on decline of insect pollinators.



CONCLUSION

