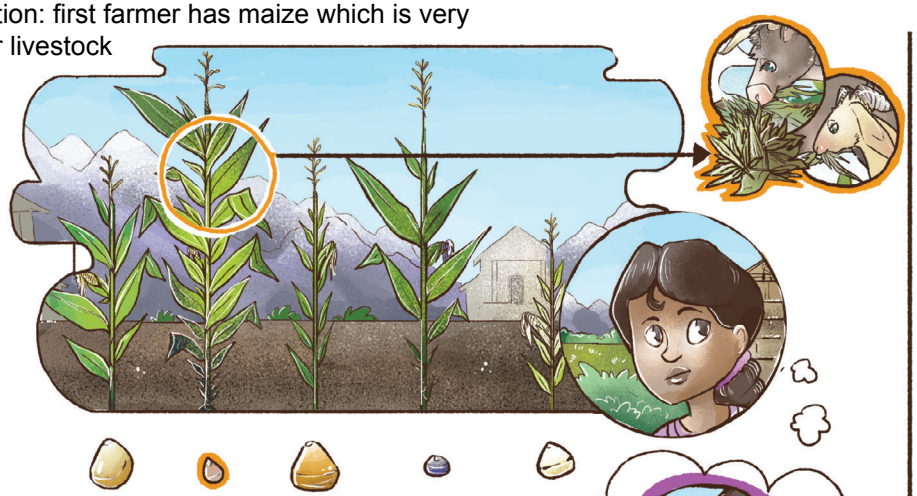
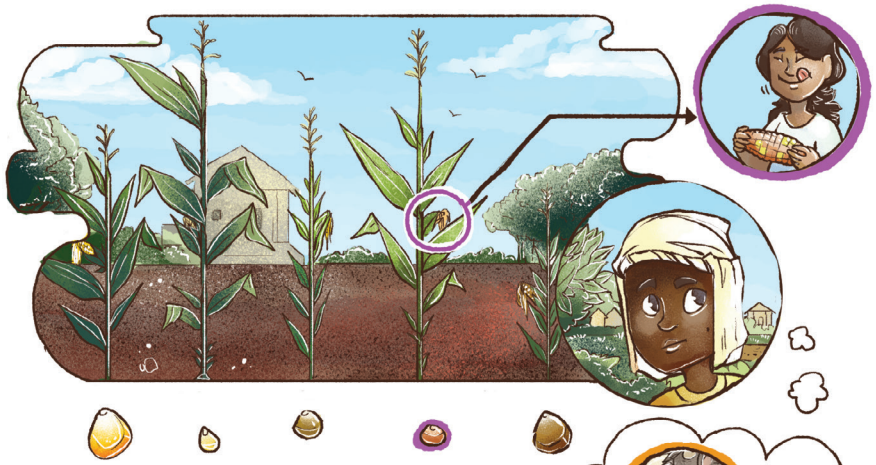
Lesson: Exchanging seeds with farmers from other villages can be beneficial.

1. Situation: first farmer has maize which is very good for livestock



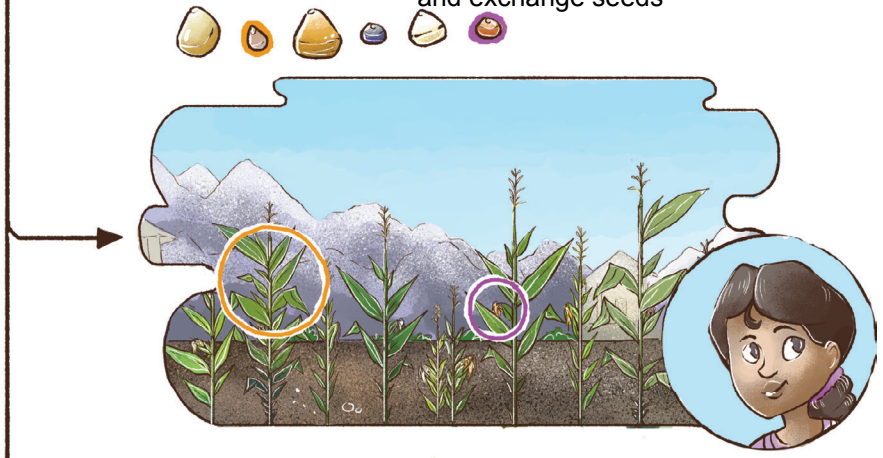
2. First farmer wants maize which is tastier or healthier for humans

3. Second farmer in nearby village has maize which is tastier for humans

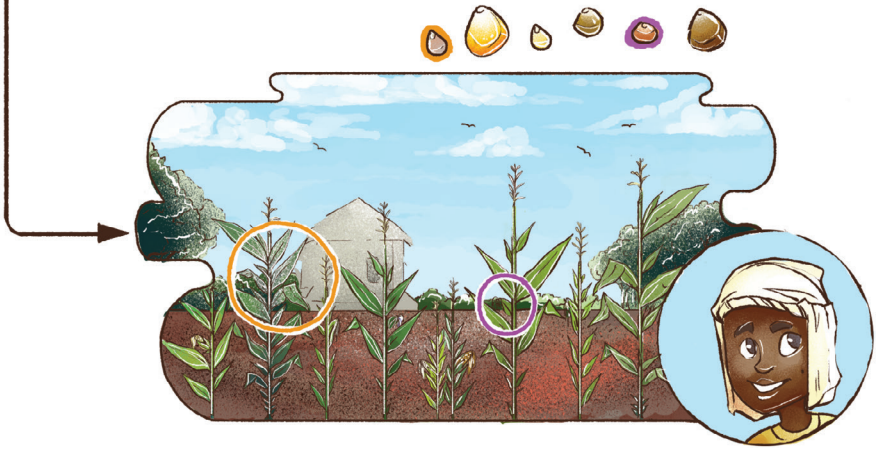


4. Second farmer wants maize which is very good for livestock

5. Solution: the two farmers meet and exchange seeds



6. Now both farmers have best maize for all purposes



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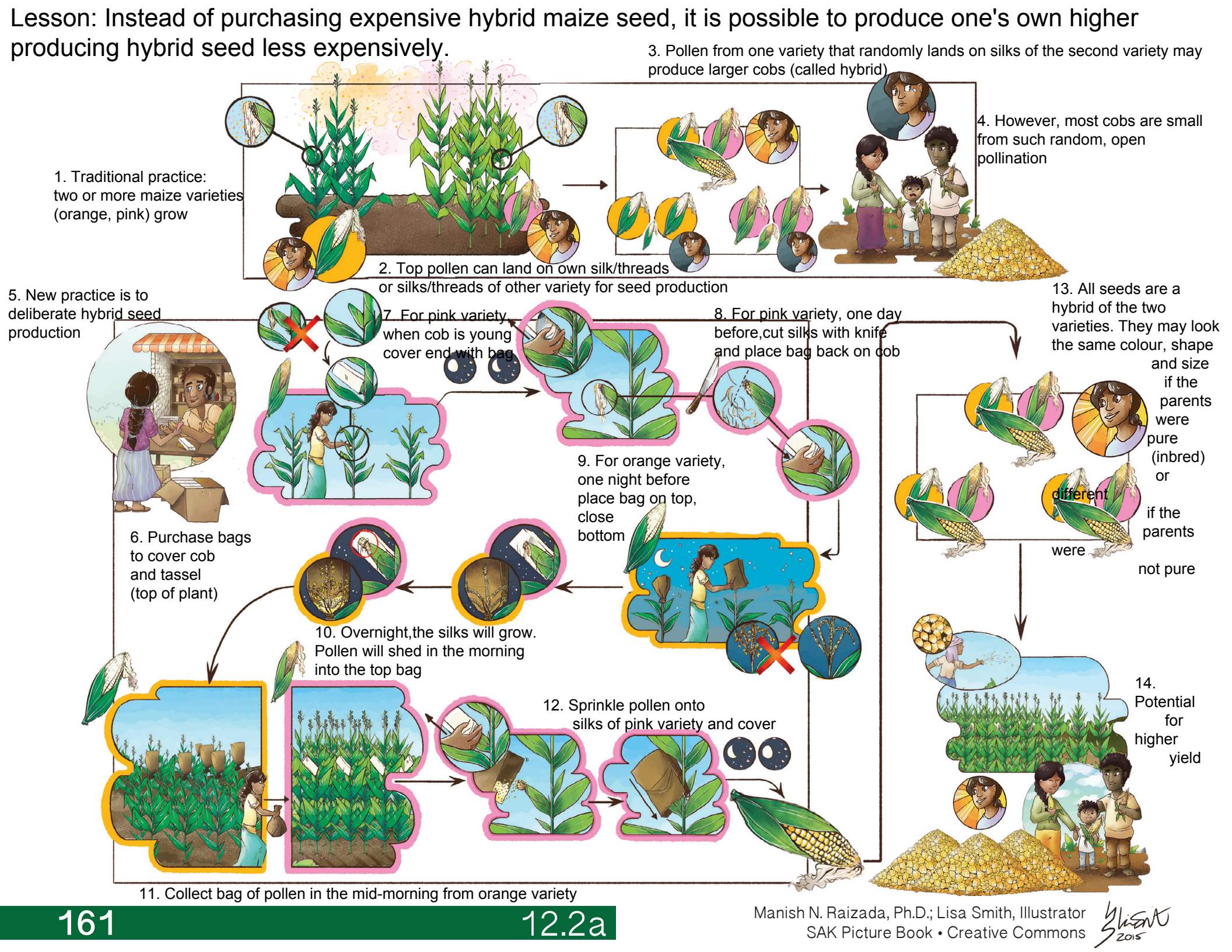
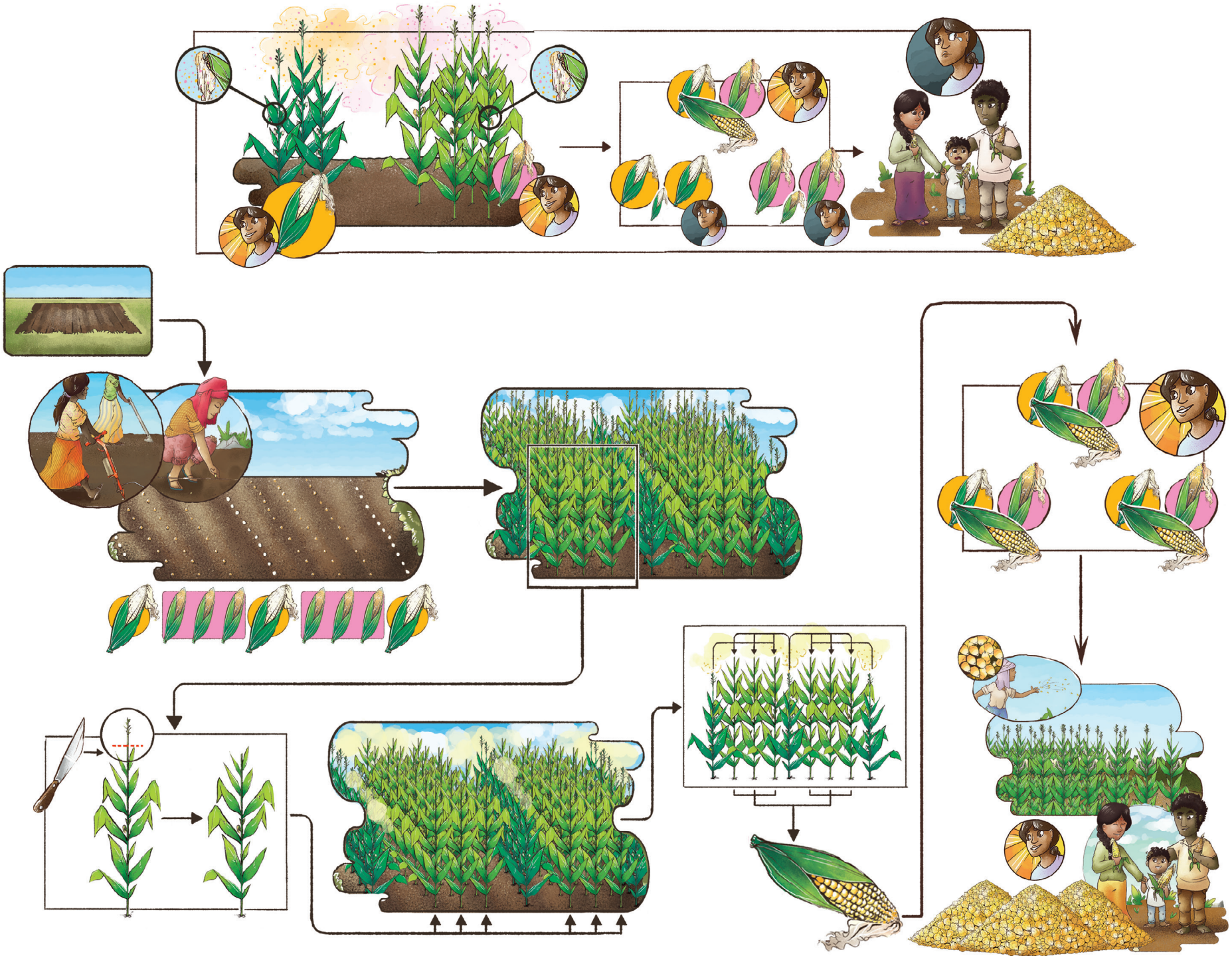
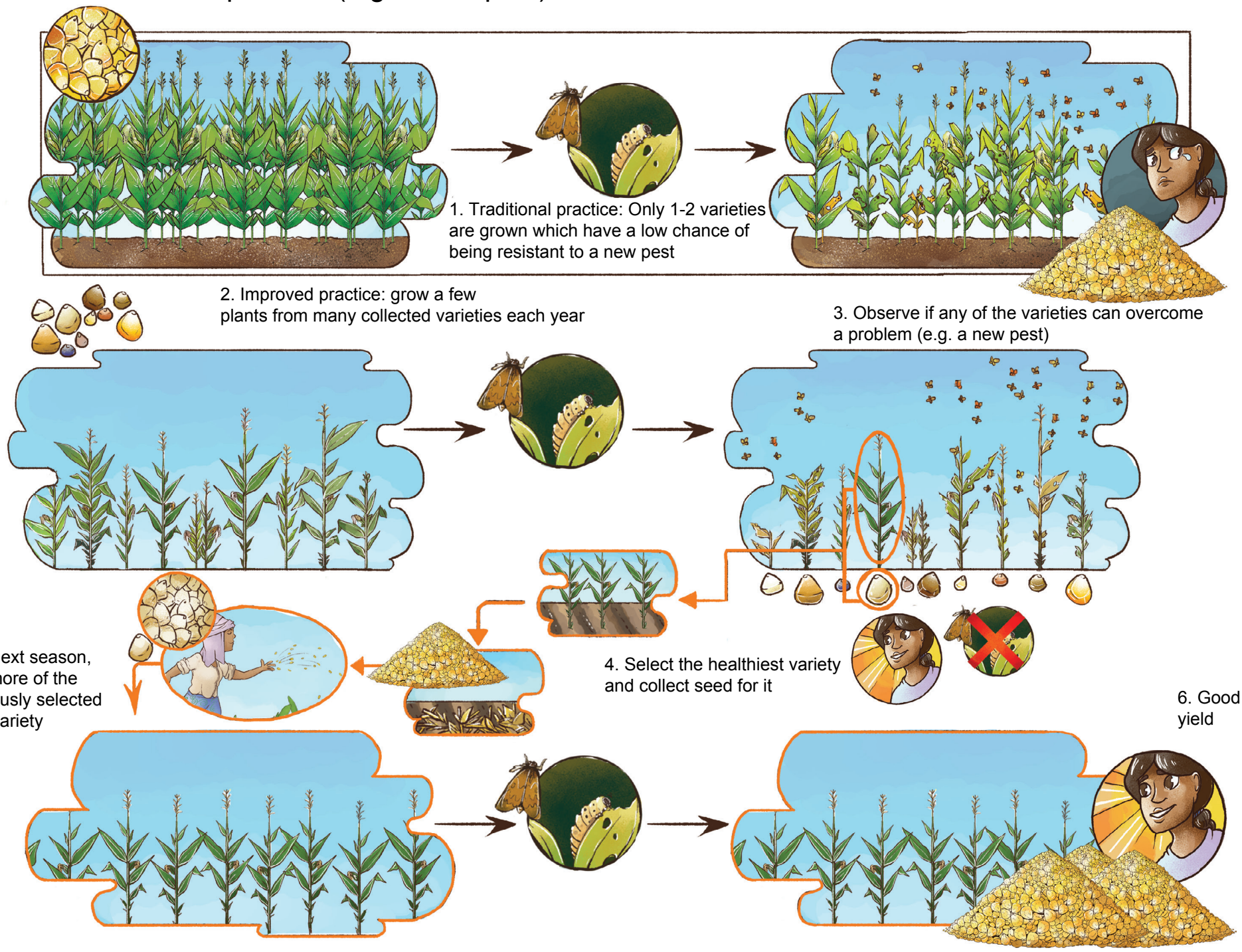
Lesson: Instead of purchasing expensive hybrid maize seed, it is possible to produce one's own higher producing hybrid seed less expensively.



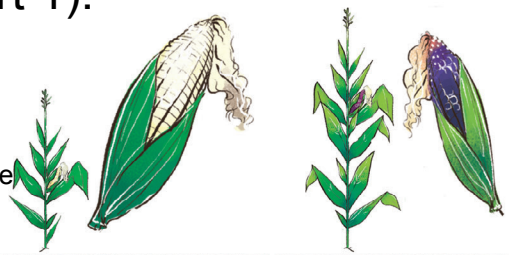


Lesson: It is useful to maintain multiple varieties of each crop in order to test whether a particular variety may overcome a new problem (e.g. a new pest).

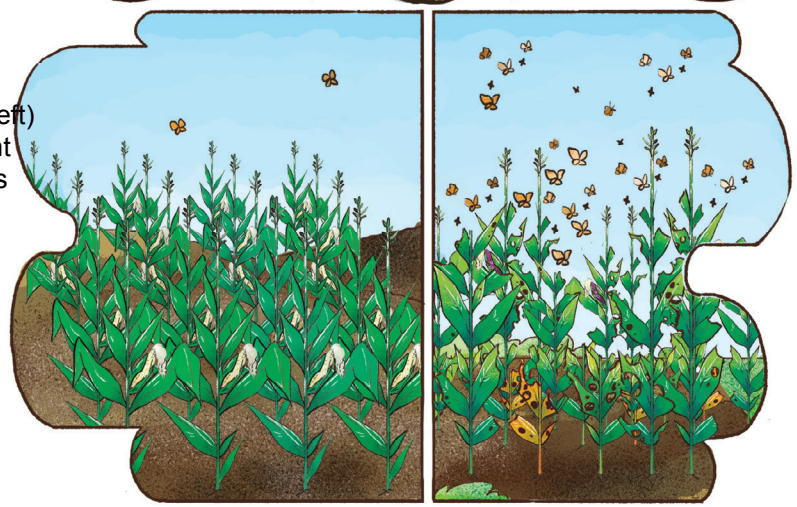


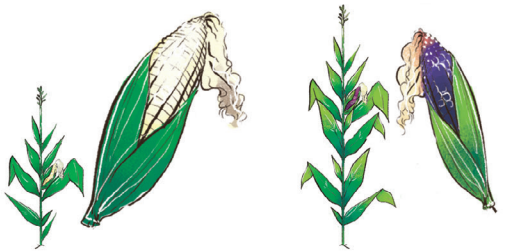
Lesson: It may be possible to combine the best aspects of two crop varieties into a single new variety (part 1).

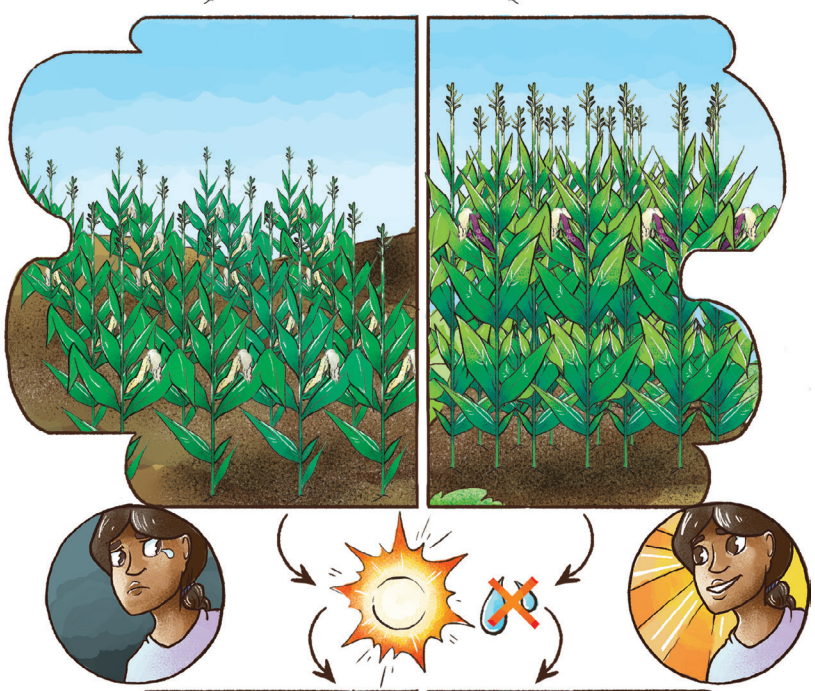
1. Example: Imagine two varieties of maize (white, purple)



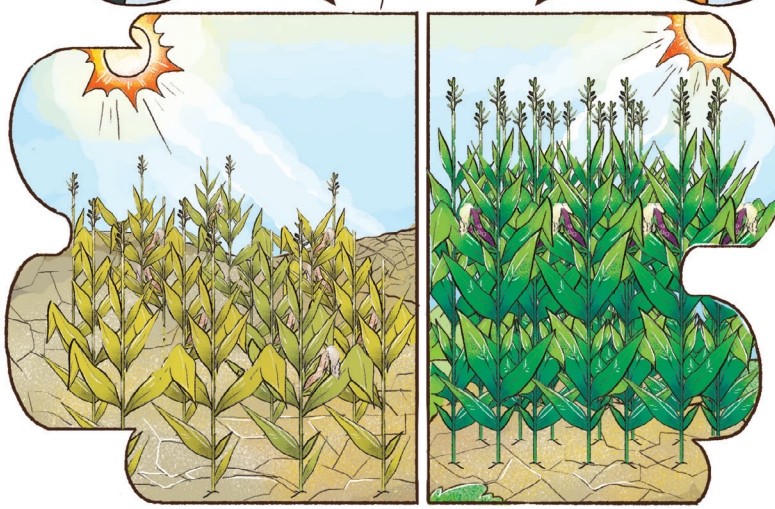
2. Imagine the the white maize variety (left) is tolerant to insects but not the purple maize variety (right)







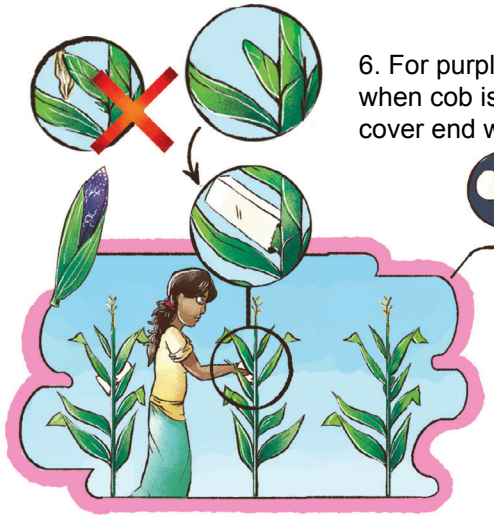
3. Imagine that the purple maize variety (right) is resistant to drought but not the white maize variety (left)



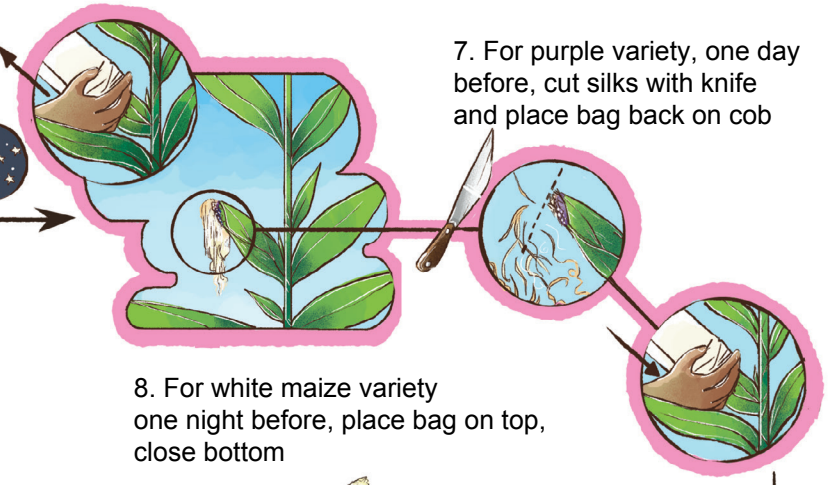
Lesson: It may be possible to combine the best aspects of two crop varieties into a single new variety (part 2).

4. It may be possible to create a new maize variety which has the desired traits (e.g. insect resistance and drought resistance) from two varieties: like two parents creating a child

5. Purchase bags to cover cob and tassel (top of plant)



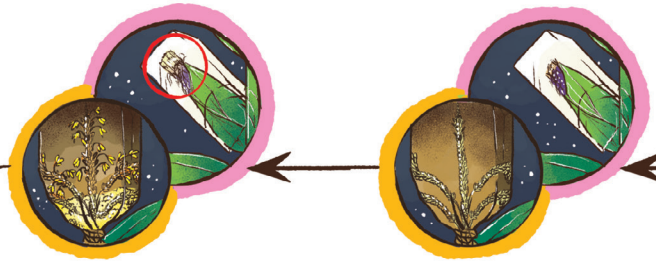
6. For purple variety, when cob is young, cover end with bag

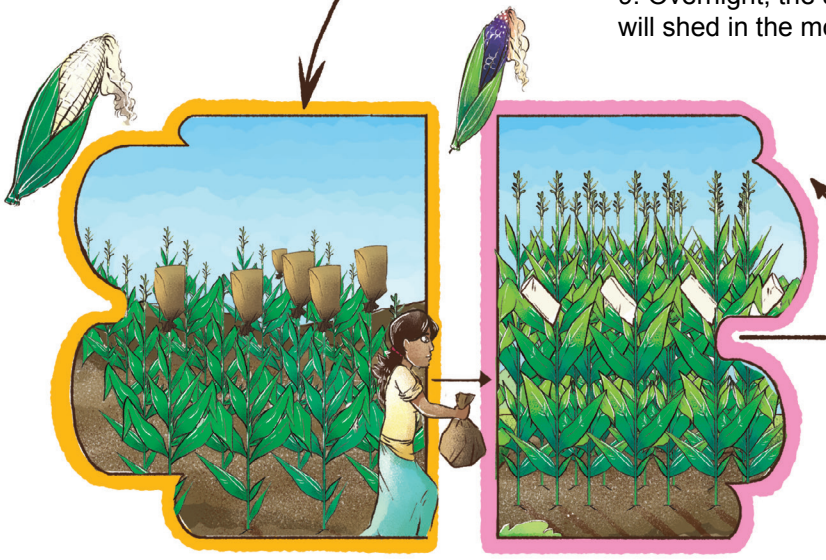


7. For purple variety, one day before, cut silks with knife and place bag back on cob

8. For white maize variety one night before, place bag on top, close bottom

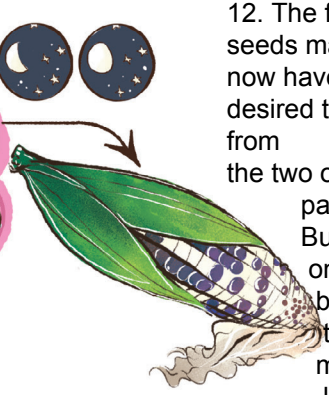
9. Overnight, the skills will grow. Pollen will shed in the morning into the top bag





10. Collect bag of pollen in the mid-morning from white variety.

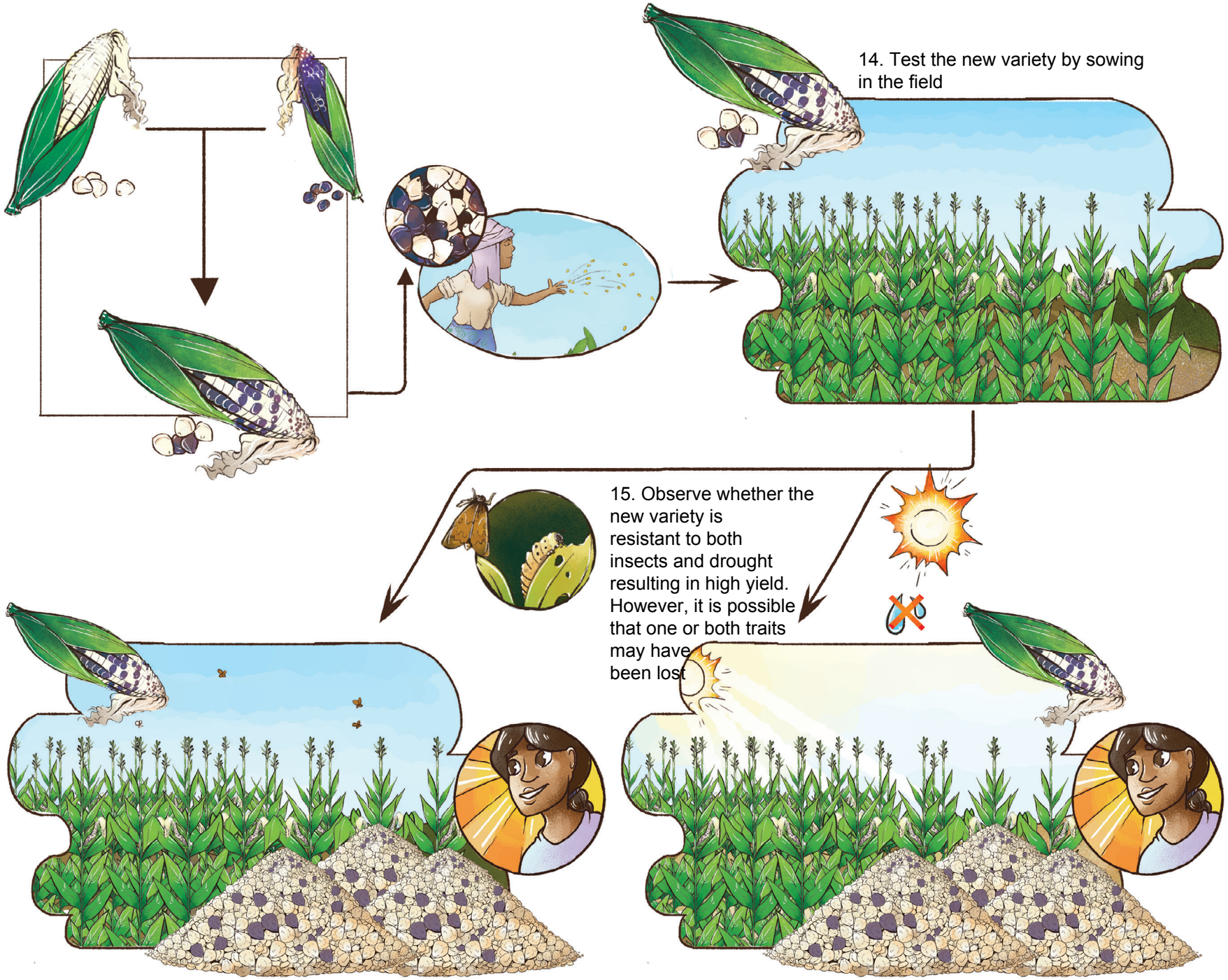
11. Sprinkle pollen onto silks of purple variety and cover



12. The final seeds may now have the desired traits from the two original parents. But also one or both traits may be lost

Lesson: It may be possible to combine the best aspects of two crop varieties into a single new variety (part 3).

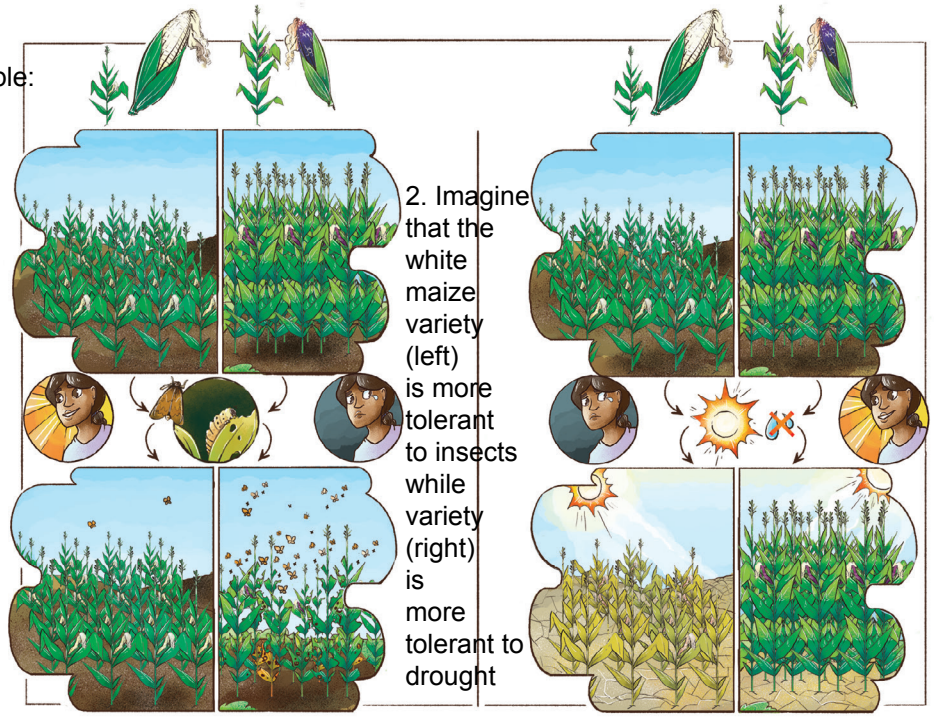
13. To review, as an example, the white maize variety (resistant to insect) and purple maize variety (resistant to drought) were used to create a new child with the hope that the child would have both good traits.



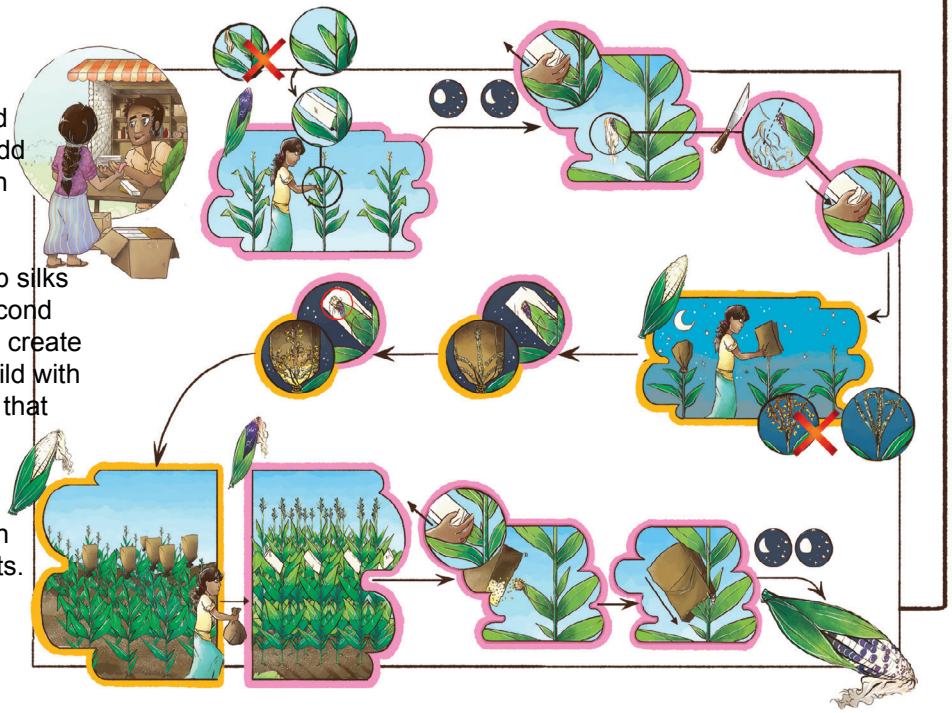
Lesson: After the best benefits of two crop varieties have been combined into a single variety, it is possible to have the new variety closely resemble one of the original varieties (part 1)

1. Example: Imagine two varieties of maize (white, purple)

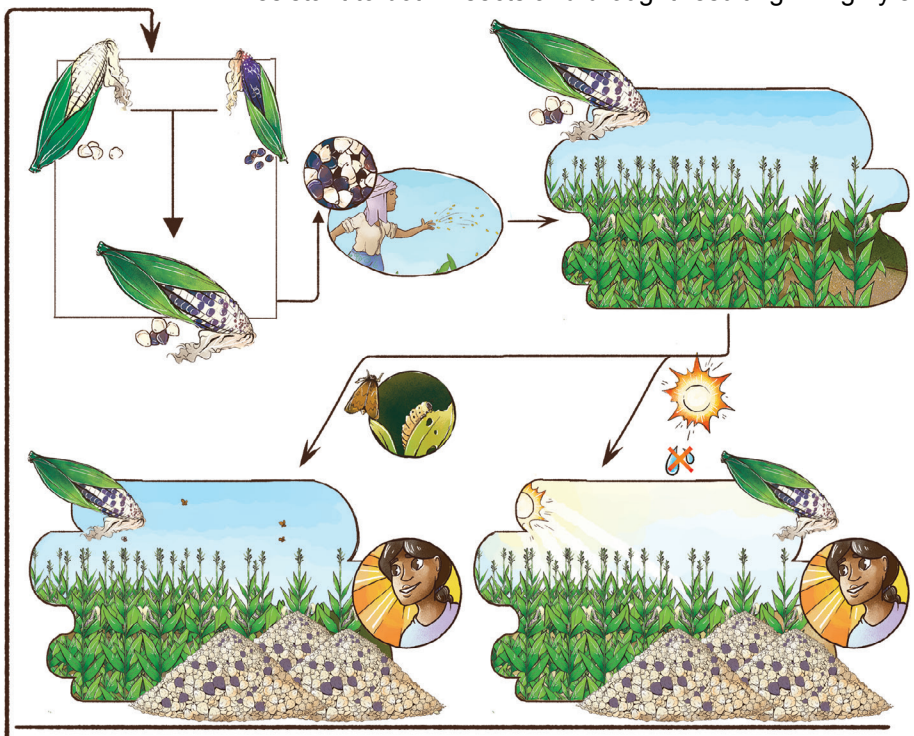
2. Imagine that the white maize variety (left) is more tolerant to insects while variety (right) is more tolerant to drought

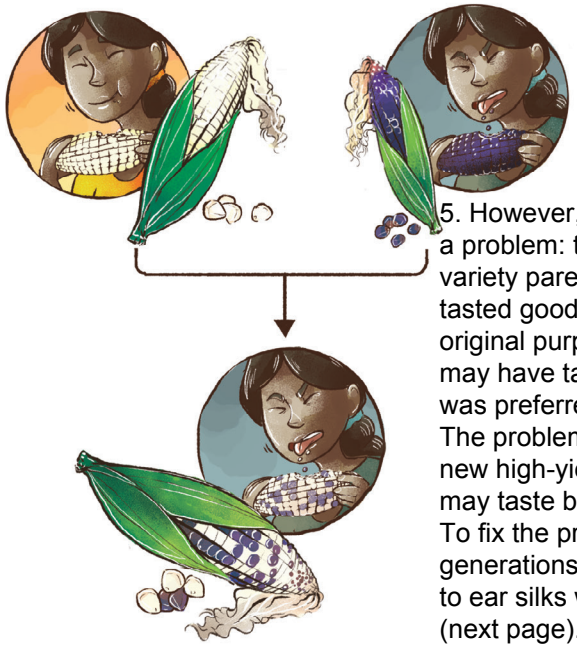


3. As described earlier, add the pollen of one variety to the cob silks of the second variety to create a new child with the hope that the child variety would have both good traits.



4. As described earlier, it is hoped that the new variety will be resistant to both insects and drought resulting in high yield





5. However, there may be a problem: the original white variety parent may have tasted good, while the original purple parent variety may have tasted bad (but was preferred by chickens). The problem is that the new high-yielding child variety may taste bad to humans. To fix the problem, multiple generations of adding pollen to ear silks will be required (next page).

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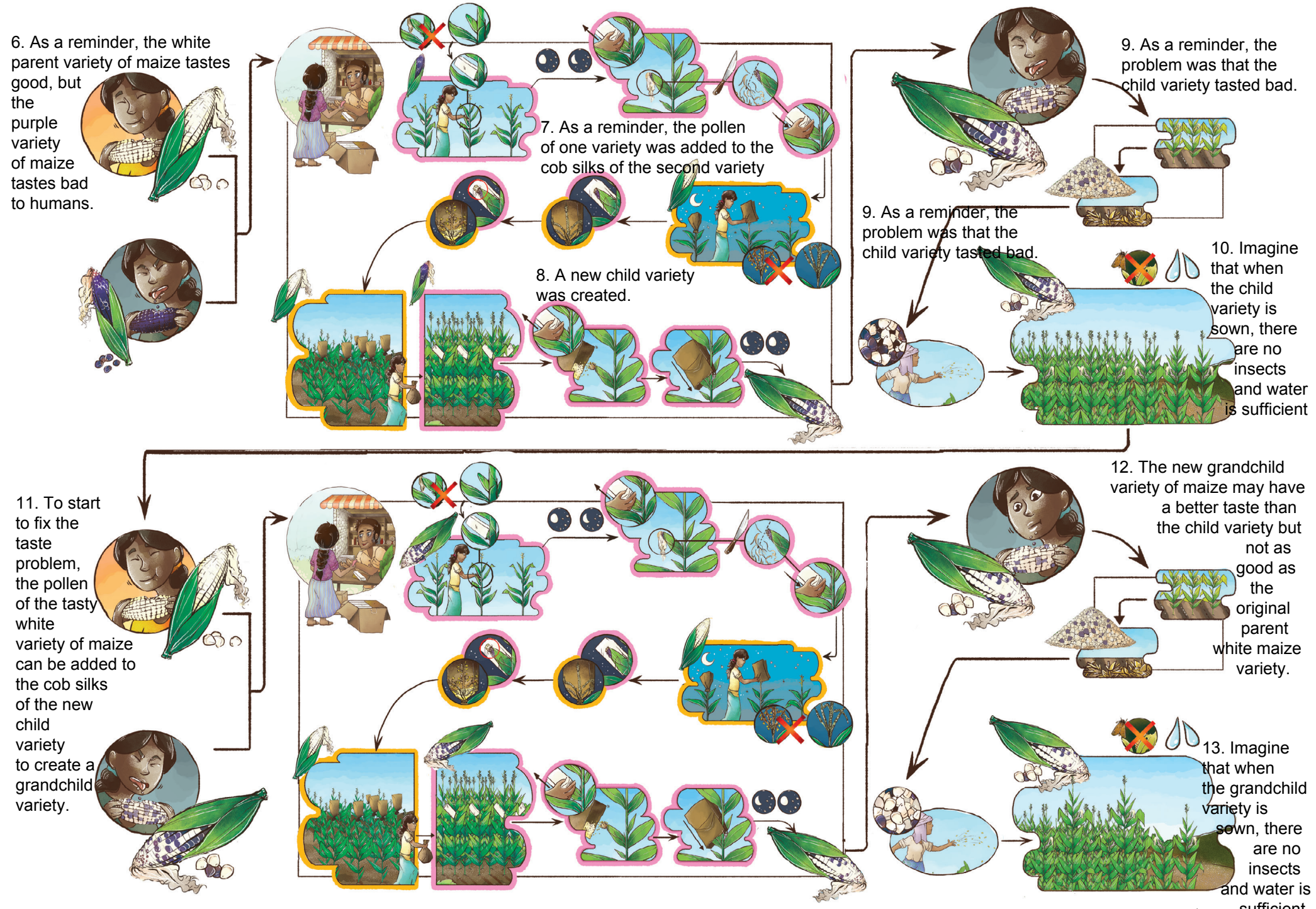
Lesson: After the best benefits of two crop varieties have been combined into a single variety, it is possible to have the new variety closely resemble one of the original varieties (part 2)



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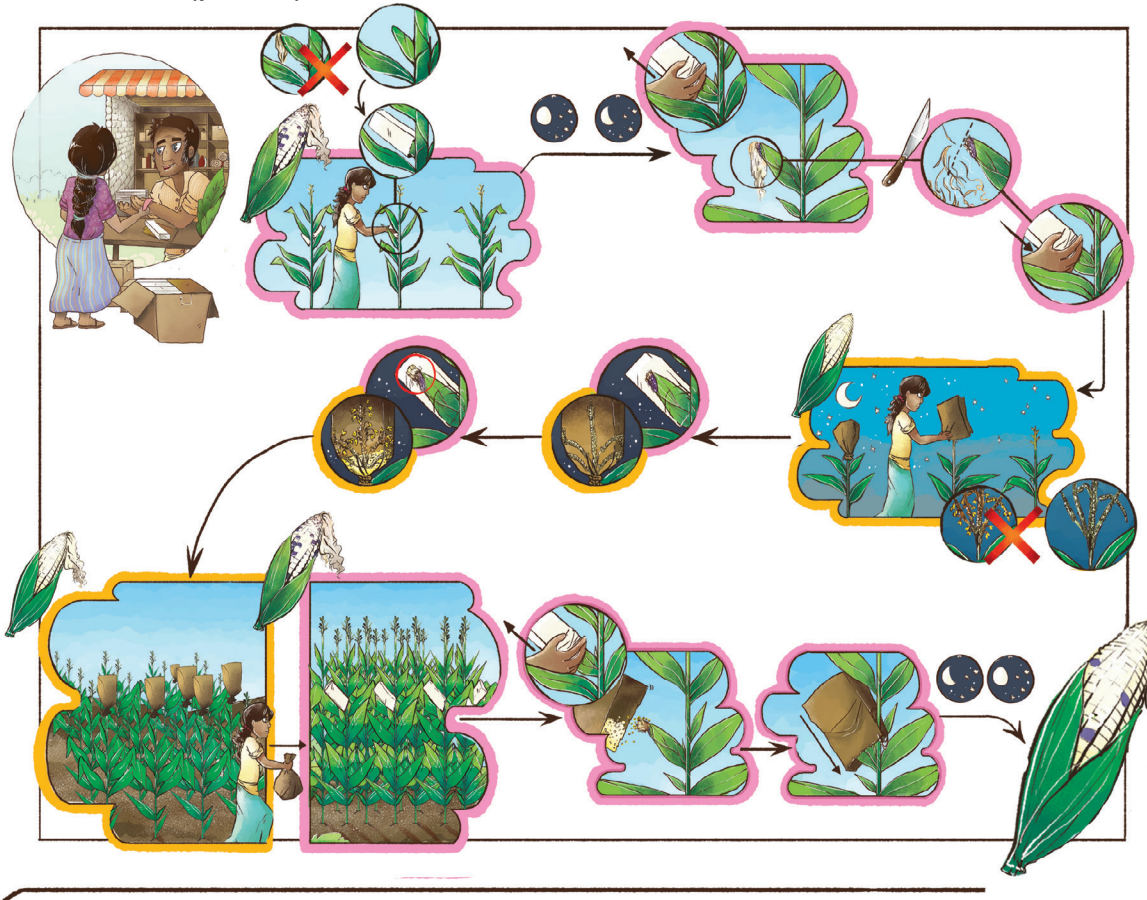
Lesson: After the best benefits of two crop varieties have been combined into a single variety, it is possible to have the new variety closely resemble one of the original varieties (part 3)

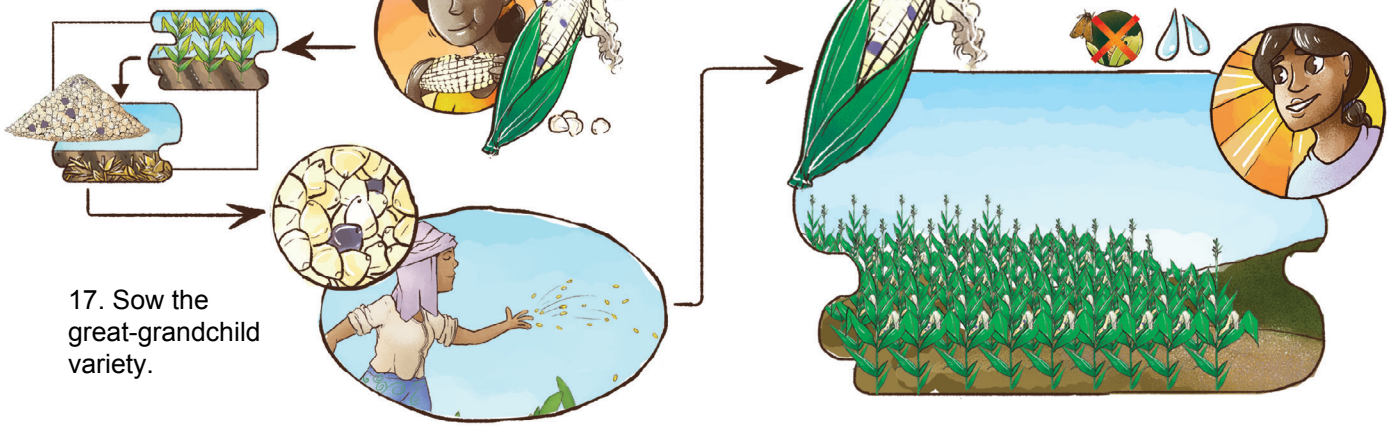
14. To continue to improve the taste of the grandchild variety, the pollen of the tasty white parent variety can be added to the cob silks of the grandchild variety.



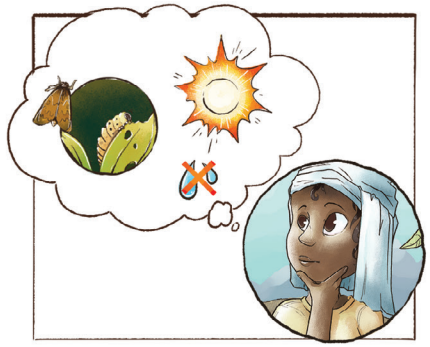
15. The new great grandchild variety will more resemble the originial white parent variety

16. The great-grandchild variety of maize is now tasty.

18. Imagine that when the great-grandchild variety is sown, there are no insects and water is sufficient.



19. It is not clear whether the great-grandchild variety has kept its resistance to both insects and drought.

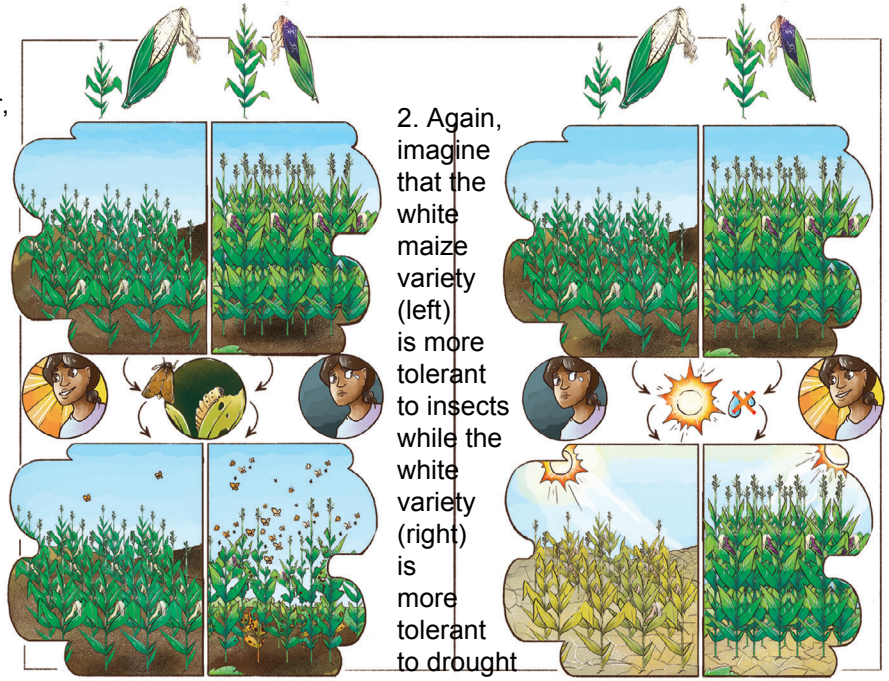


17. Sow the great-grandchild variety.

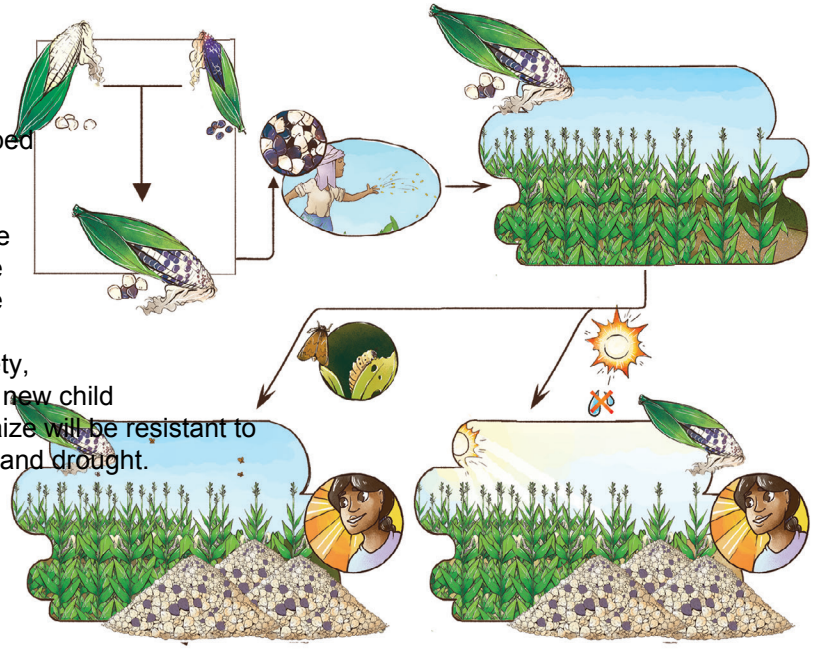
Lesson: After the best benefits of two crop varieties have been combined into a single variety, it is possible to have the new variety closely resemble one of the original parent varieties but to maintain the benefits of both varieties (part 1)

1. As a reminder, imagine two varieties of maize (white, purple)

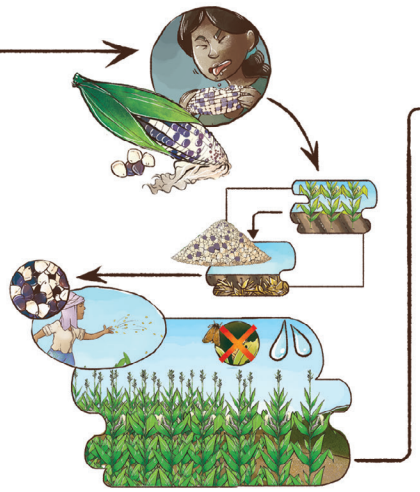
2. Again, imagine that the white maize variety (left) is more tolerant to insects while the white variety (right) is more tolerant to drought



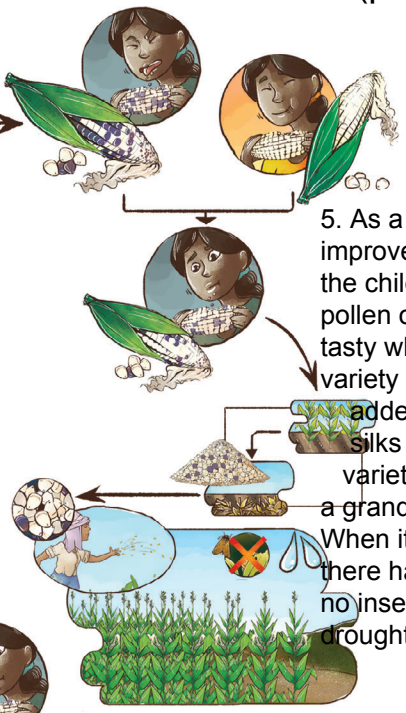
3. As described earlier, it is hoped that by adding the pollen of one variety to the silks of the second variety, the resulting new child variety of maize will be resistant to both insects and drought.



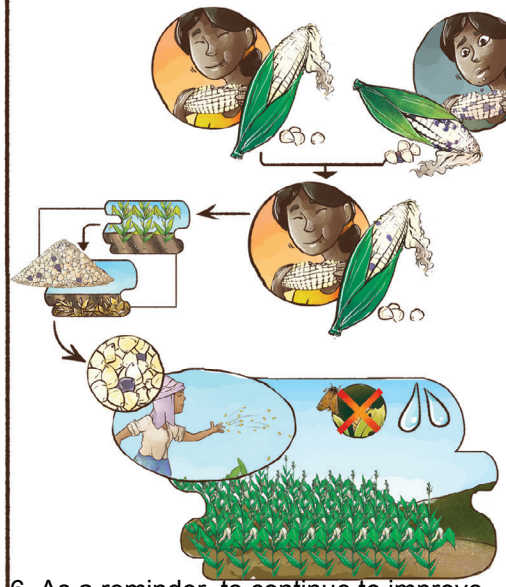
4. As a reminder, the child variety tastes bad. When it is sown, there happens to be no insects or drought.



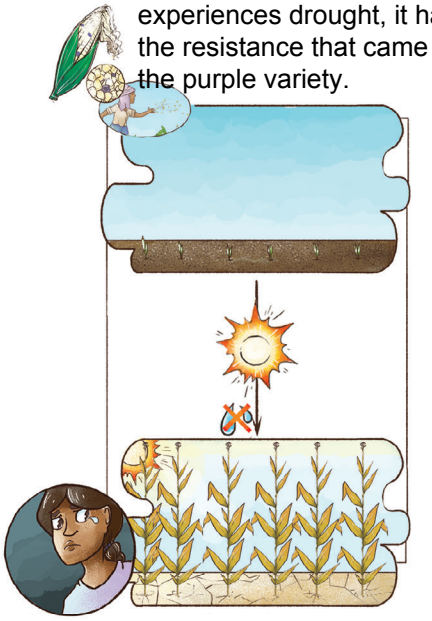
5. As a reminder, to improve the taste of the child variety, the pollen of the tasty white parent variety can be added to the cob silks of the child variety to create a grandchild variety. When it is sown, there happens to be no insects or drought.



6. As a reminder, to continue to improve the taste of the grandchild variety, the pollen of the tasty white parent variety can be added to the cob silks of the grandchild variety to create a great-grandchild variety. When it is sown, there happens to be no insects or drought.



7. Problem: When the great-grandchild variety experiences drought, it has lost the resistance that came from the purple variety.



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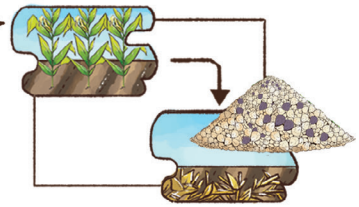
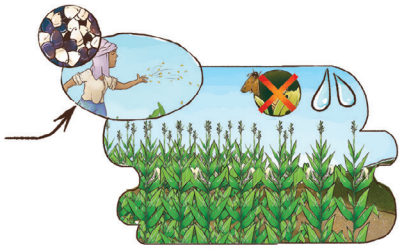
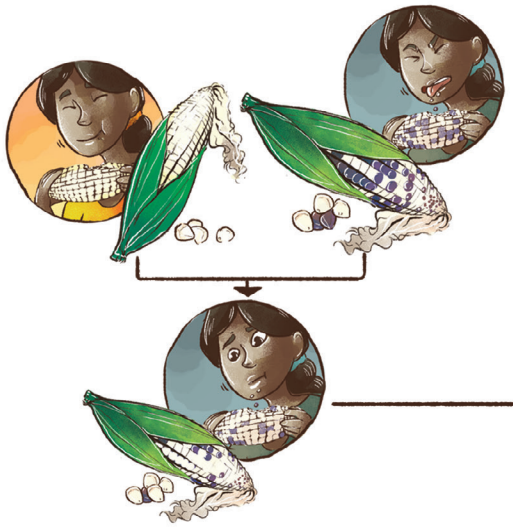
Lesson: After the best benefits of two crop varieties have been combined into a single variety, it is possible to have the new variety closely resemble one of the original parent varieties but to maintain the benefits of both varieties (part 2)

8. There is a method to maintain the benefits of both the white variety and purple variety, but at the same time have the variety resemble the most desired white variety that is tasty.

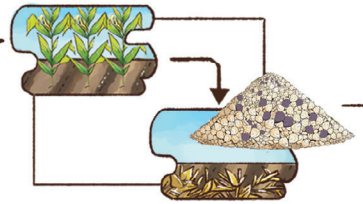


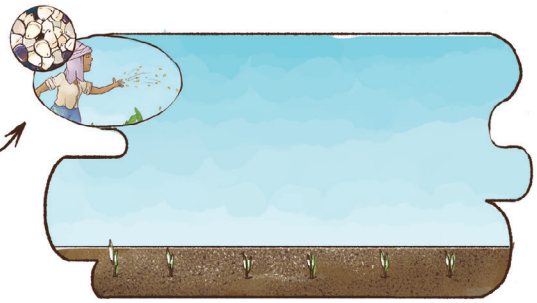
9. After creating the child variety from the white and purple parent maize varieties, sow the child variety.

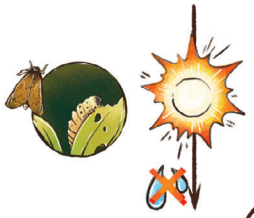




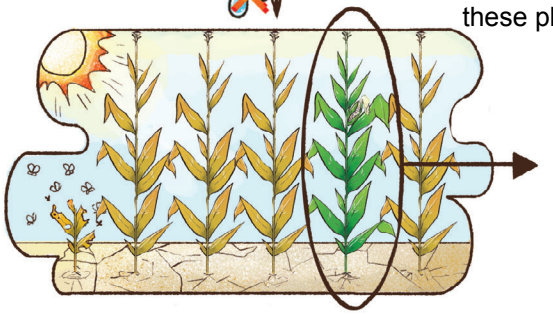
10. As before, to improve the taste of the child variety, the pollen of the tasty white parent variety can be added to the cob silks of the child variety to create a grandchild variety.







11. However, this time the grandchild variety should be exposed to drought (no irrigation) and the insects should not be prevented, in order to discover which plants ave kept resistance to both drought and insects. Select the seeds of only these plants for future sowing.



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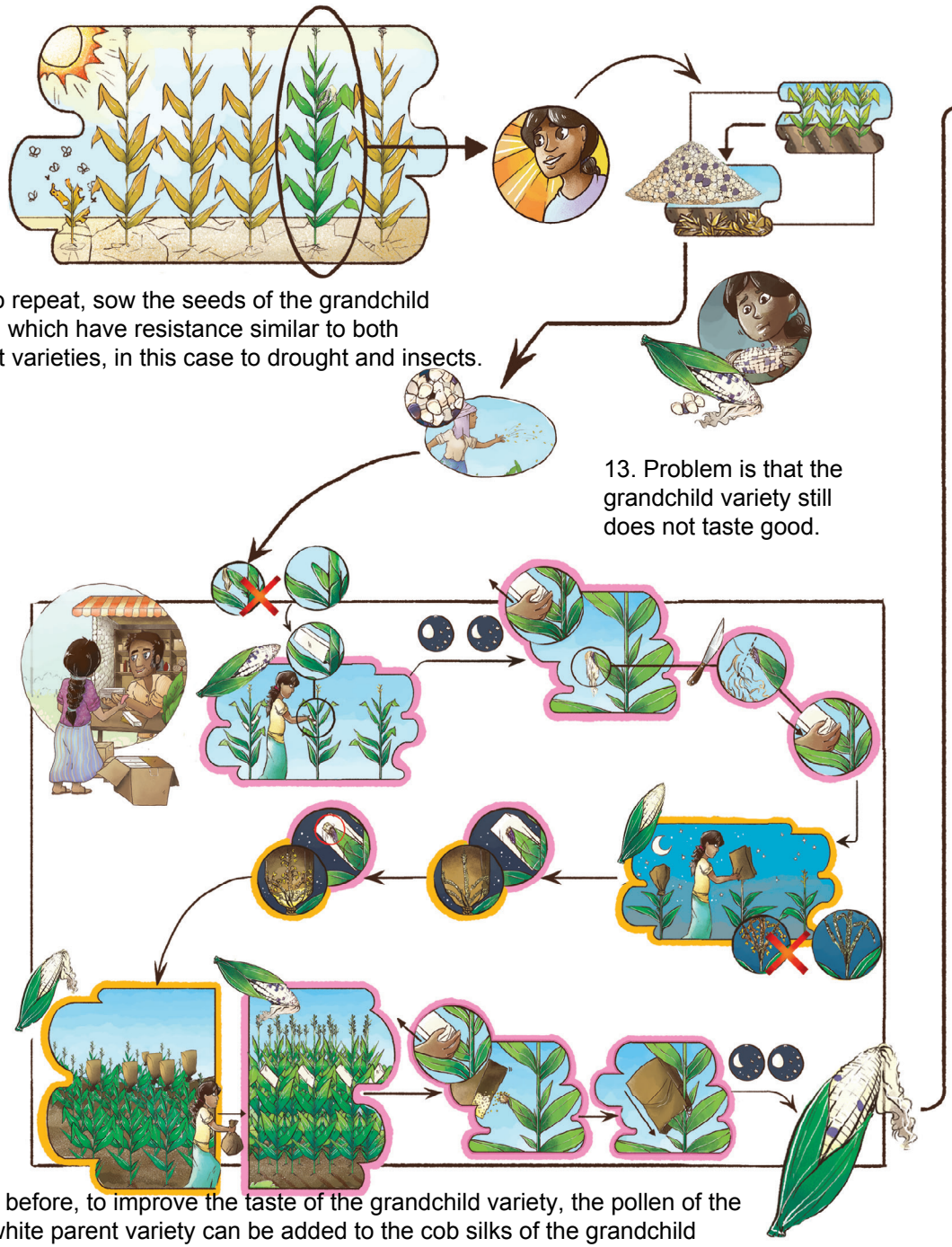
Lesson: After the best benefits of two crop varieties have been combined into a single variety, it is possible to have the new variety closely resemble one of the original parent varieties but to maintain the benefits of both varieties (part 3)



12. To repeat, sow the seeds of the grandchild plants which have resistance similar to both parent varieties, in this case to drought and insects.

13. Problem is that the grandchild variety still does not taste good.

14. As before, to improve the taste of the grandchild variety, the pollen of the tasty white parent variety can be added to the cob silks of the grandchild variety to create a great-grandchild variety.

15. Sow the great-grandchild variety..

16. However, again this time the great-grandchild variety should be exposed to drought (no irrigation) and the insects should not be prevented, in order to discover which plants have kept resistance to both drought and insects.

17. Select the seeds of only these healthy plants for future sowing.