1
00:00:01,060 --> 00:00:04,600
The Indus River has been a lifeline to farmers for thousands of years

2
00:00:04,600 --> 00:00:09,150
where skills and knowledge have been passed down from generation to generation

3
00:00:09,150 --> 00:00:17,880
Our children are farmers, learned farming from elders, we've been doing it for generations.

4
00:00:17,880 --> 00:00:26,360
Now, using NASA satellites, the next generation are experimenting with new tricks of the trade.

5
00:00:26,360 --> 00:00:28,630
Flowing for almost two thousand miles,

6
00:00:28,630 --> 00:00:33,170
the Indus River provides freshwater for watering crops in four countries.

7
00:00:33,170 --> 00:00:39,650
In Pakistan, 90 percent of agriculture work relies on surface water and groundwater from the river.

8
00:00:39,650 --> 00:00:43,340
But over the past few decades, populations have grown

9
00:00:43,340 --> 00:00:47,160
and these freshwater resources have become scarce.

10
00:00:47,160 --> 00:00:52,360
Earlier this season, the groundwater level was low.

11
00:00:52,360 --> 00:00:59,300
We drilled a well near our house, but it stopped producing after one week.

12
00:00:59,300 --> 00:01:07,570
The cotton was short last year and it was not just a loss for a single farmer, but for all of Pakistan.

13
00:01:07,570 --> 00:01:12,130

Two, three generations ago, when water was plentiful,

14
00:01:12,130 --> 00:01:15,520
they had more water than what they needed to grow crops.\h

15
00:01:15,520 --> 00:01:16,860
This is Faisal Hossain.

16
00:01:16,860 --> 00:01:19,740
He leads a research group at the University of Washington

17
00:01:19,740 --> 00:01:23,720
that explores how developing countries can use water more sustainably.

18
00:01:23,720 --> 00:01:26,630
But as the demand grew, they had to grow more crops.

19
00:01:26,630 --> 00:01:28,880
and when they didn't have enough surface water,

20
00:01:28,880 --> 00:01:30,820
they were pumping it from the ground.

21
00:01:30,820 --> 00:01:35,020
Today, it has become one of the most depleted basins in the world,

22
00:01:35,020 --> 00:01:39,300
which, compounded with high crop demands, is cause for concern.

23
00:01:39,300 --> 00:01:46,140
We farmers are in real crisis because one crop is being harvested while the next is made ready for planting —

24
00:01:46,140 --> 00:01:50,740
To tackle this, the Pakistan Council of Research in Water Resources

25
00:01:50,740 --> 00:01:53,850
want to help farmers look beneath the soil.

26
00:01:53,850 --> 00:01:58,730
You need to know the rainfall, the weather conditions, and the crop condition.

27
00:01:58,730 --> 00:02:01,020
We get a lot of that from satellites\h—

28
00:02:01,020 --> 00:02:05,570
NASA satellite missions such as the GPM, the Global Precipitation Measurement Mission.

29
00:02:05,570 --> 00:02:07,910
With help from Faisal’s research group,

30
00:02:07,910 --> 00:02:11,950
they’re attempting to give a clear picture of the water available in the land

31
00:02:11,950 --> 00:02:15,750
allowing farmers to see exactly how much they need to irrigate

32
00:02:15,750 --> 00:02:20,130
and avoid under or overwatering crops, which can hinder crop growth.

33
00:02:20,130 --> 00:02:23,490
Using NASA satellites and ground sensors,

34
00:02:23,490 --> 00:02:26,030
scientists are gathering weather measurements like temperature,

35
00:02:26,030 --> 00:02:29,770
wind speed, pressure, humidity and solar radiation--.

36
00:02:29,770 --> 00:02:37,130
Combining that information with weather prediction models they have created the Irrigation Advisory System.

37
00:02:37,130 --> 00:02:43,390
This provides real-time estimates of the amount of water that evaporates through sunlight and wind.

38
00:02:43,390 --> 00:02:47,950

In short, scientists can analyze how much water specific crops need.

39
00:02:47,950 --> 00:02:50,320
Dark regions show a higher demand of water.

40
00:02:50,320 --> 00:02:53,540
Light regions show a lower demand of water.

41
00:02:53,540 --> 00:02:58,740
This indicates that crops in different parts of the country require different amounts of water.

42
00:02:58,740 --> 00:03:02,270
These calculations are done throughout the country for different crops

43
00:03:02,270 --> 00:03:07,500
and are analyzed with rainfall measurements from NASA’s Global Precipitation Measurement mission.

44
00:03:07,500 --> 00:03:12,490
Then, they’re turned into weekly instructions sent to farmers’ cell phones.

45
00:03:12,490 --> 00:03:17,260
Dear farmer friend, we would like to inform you that the irrigation need for your banana crop was 2 inches durin

46
00:03:17,260 --> 00:03:19,480
Whether it's a flip phone or a smartphone,

47
00:03:19,480 --> 00:03:23,930
it has pretty good penetration even in developing countries.

48
00:03:23,930 --> 00:03:28,040
Since the program began in Pakistan in 2016,

49
00:03:28,040 --> 00:03:32,120
it has grown from 700 farmers to more than 100,000.

50
00:03:32,120 --> 00:03:36,780
And now, the system has expanded to India and Bangladesh –

51
00:03:36,780 --> 00:03:40,100
other countries who are also scarce in water.\h \h

52
00:03:40,100 --> 00:03:43,420
Having access to this information is not only important now,

53
00:03:43,420 --> 00:03:46,760
but it will be critical as our planet continues to change.

54
00:03:46,760 --> 00:03:50,100
We believe that access is a fundamental human right.