

Floods in Pakistan: Human Development at Risk

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KEY TAKEAWAYS

Twenty-five percent of families with children ages 3 to 17 report flooding in their area, with families with more educated parents showing more resilience to the climate shock.

→ **Direct impacts on families** include damage to house, loss of crops and livestock as well as the loss of income sources.

→ **Indirect impacts on families** include limited access to roads, bridges, transport services, schools, health centers, and increased food insecurity as well as increased health risks such as dengue, malaria, and behavioral problems in children.

→ Direct and indirect impacts on families will likely **decrease children's school attendance and learning** as educational services will be limited and as families cope with the challenges of reconstructing their homes and addressing income loss.

→ **Floods have exacerbated food insecurity**, which families were already facing due to higher inflation, leading to a likely negative impact on the nutritional and health outcomes for children.

The combination of all these factors is likely to increase learning poverty and limit the opportunities of cognitive, socioemotional, and healthy development of an estimated 1 million children in Pakistan who may not return to school.

Natural disasters not only cause death and destruction to physical capital but also have large and long-term effects on children's opportunities to accumulate human capital through factors such as nutrition, education, health, and negative shocks to family income (Baez, de la Fuente and Santos 2010). Investing in human capital is the best way to enhance resilience and adapt to climate change (Pangestu 2022).

This note assesses the effects of the 2022 floods on human capital in Pakistan. It focuses on the results of a Pakistan-wide phone survey that gathered information on the experiences of approximately 4,000 families with children ages 3 to 17. The survey was originally designed to track children's return to school after school closures due to the COVID-19 pandemic, but the team adapted the survey methodology to ensure that it could better document and understand the challenges families with children are facing during the 2022 floods and that the country is experiencing as it seeks to protect and rebuild human capital for the future. (For the methodology and caveats about the interpretation of results, see final section of this note.)

Starting on June 14, 2022, floods caused by unusually heavy monsoon rains covered nearly one-third of Pakistan. While every province was impacted, estimates show that Sindh was the worst affected. Satellite-based estimates for the flooded areas suggest that approximately 4,000 km² in Sindh, 900 km² in Punjab, and 300 km² in Balochistan were under water for weeks (UNOSAT 2022).

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More than 7,000 schools are being used to accommodate people displaced by flooding, meaning they are not currently providing access to education.

Estimates of the humanitarian impacts of the floods are dire. It is estimated that over 33 million people were affected by the floods, while more than 8 million were displaced and nearly 600,000 were living in relief sites (NDMA 2022; WFP 2022). As of October 15, 2022, the floods had killed at least 1,717 people. An estimated 13 million people remain directly exposed or living close to flooded areas, and livelihoods continue to be severely and adversely affected. According to the revised UN Flash Appeal, approximately 21 million people require humanitarian assistance. Standing waters, food insecurity, malnutrition as well as water- and vector-borne diseases remain serious risks while immediate relief efforts are ongoing (NDMA 2022; UNOSAT 2022; WFP 2022; OCHA 2022).

The floods have also caused extensive damage to infrastructure. As of October, reported infrastructure damages include approximately 2.1 million homes; 13,115 km of roads; and 436 bridges (NDMA 2022). Almost 26,600 schools have been damaged or destroyed, most of which are in Sindh. Currently, 7,062 schools across the country are being used as shelters, rendering them unusable for teachers and their students even after the emergency passes. In Balochistan, most schools are being used as emergency

shelters. As a result, an estimated 3.5 million children have had their schooling disrupted (NDMA 2022; UNICEF 2022).

The economic impact of the disaster is substantial as estimated by the Post-Disaster Needs Assessment (PDNA; Government of Pakistan 2022). PDNAs quantify the impact of disasters through three measures. First, the direct cost of destroyed or damaged physical assets (*Damage*). Second, the monetary value of changes in economic flows resulting from the disaster (*Loss*). Third, recovery and reconstruction needs calculated as replacement costs for the short- and intermediate-term, and adding a premium for building back (*Needs*). The PDNA estimates a total damage of nearly US\$ 15 billion, losses of US\$ 15.2 billion, and total needs of US\$ 16.3 billion. Almost every sector of the economy was impacted, but housing, transport, and communications were affected the most. In the education sector, total damage is estimated to be US\$ 559 million, losses are US\$ 219 million, and needs for recovery amount to US\$ 918 million. Moreover, the national poverty rate may increase, pushing between 8.4 and 9.1 million people into poverty. However, these estimates do not include the effects on human capital that will linger long after the floods recede.

The impact of the floods will likely make it even more difficult for children to attend school and receive quality education. Before the floods, there were between 18.7 and 20.7 million children out of school (PAMS 2021, Government of Pakistan 2019), and 75 percent of 10-year-olds in Pakistan were not able to read an age-appropriate text between 18.7 and 20.7 million (World Bank 2019). With the recent floods, according to new simulations, learning poverty could increase to 79 percent (Saavedra and Sherburne-Benz 2022). Estimates presented below show that at least an additional 1 million children could stop attending school.

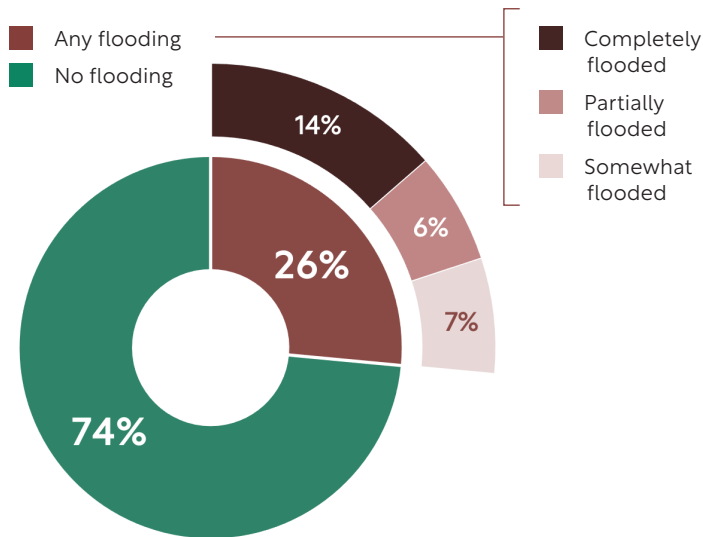
COMPOUNDING CHALLENGES

Before the natural disaster began in June 2022, between 18.7 and 20.7 million children were out of school. With the recent floods, estimates show that **at least an additional 1 million children could stop attending schools.**

I. Overall flood impacts on families with children

The floods have impacted a sizeable portion of households with children in Pakistan, threatening Pakistan’s future human development. Twenty-six percent of households with children ages 3 to 17 report living in areas that were somewhat, partially, or completely flooded (**figure 1**).

Figure 1. Almost one-third of families with children ages 3 to 17 report some flooding in their area



Floods have impacted Pakistan’s provinces and households unequally. Almost 1 out of 2 families with children in Sindh, 3 out of 4 in Balochistan, and almost 4 out of 10 in Khyber Pakhtunkhwa (KP) reported flooding in their area (**figure 2, panel A**). It is expected that the floods will further enlarge the provincial gaps in educational achievement in areas such as Sindh and Balochistan, which are known to already have the most precarious education outcomes in the country.

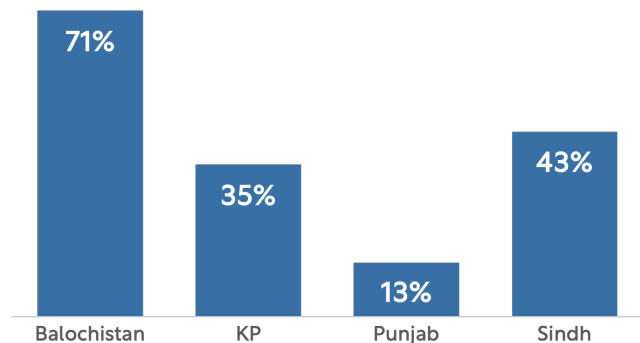
Disasters do not affect people equally as documented in the literature (Hallegatte et al. 2020; Kousky 2016); they impact the poorest hardest. Pakistan’s floods do not seem to be the exception. Households with children where the main caregiver has less education (a proxy for low income), that is, those with a middle school education or less, were on average 5 to 8 percentage points more likely (statistically) to report flooding in their area (**figure 2, panel B**). However, while floods have greater impact on lower-income households, still 20 to 25 percent of the most educated families surveyed have also reported flooding in their area.

Importantly, 14 percent of respondents report that the area they lived in was completely flooded.

This high percentage shows the strong immediate impact of floods on households and how these floods have put their children at risk of dropping out of school, food insecurity, child labor, and health conditions. The phone survey also shows how floods have a large detrimental effect on the future human development prospects of a substantial share of children in Pakistan.

Figure 2. Floods have impacted Pakistan’s provinces and households unequally

A. Households reporting flooding by province



B. Households reporting flooding by education level

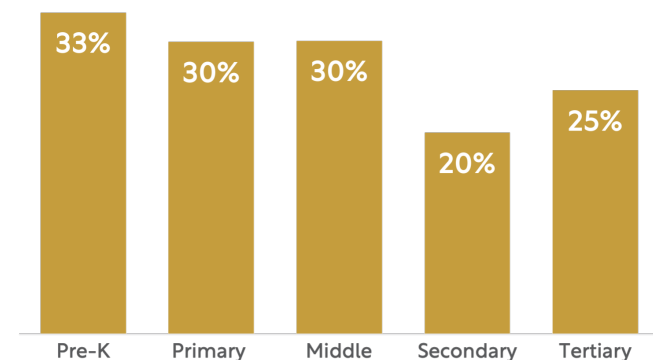
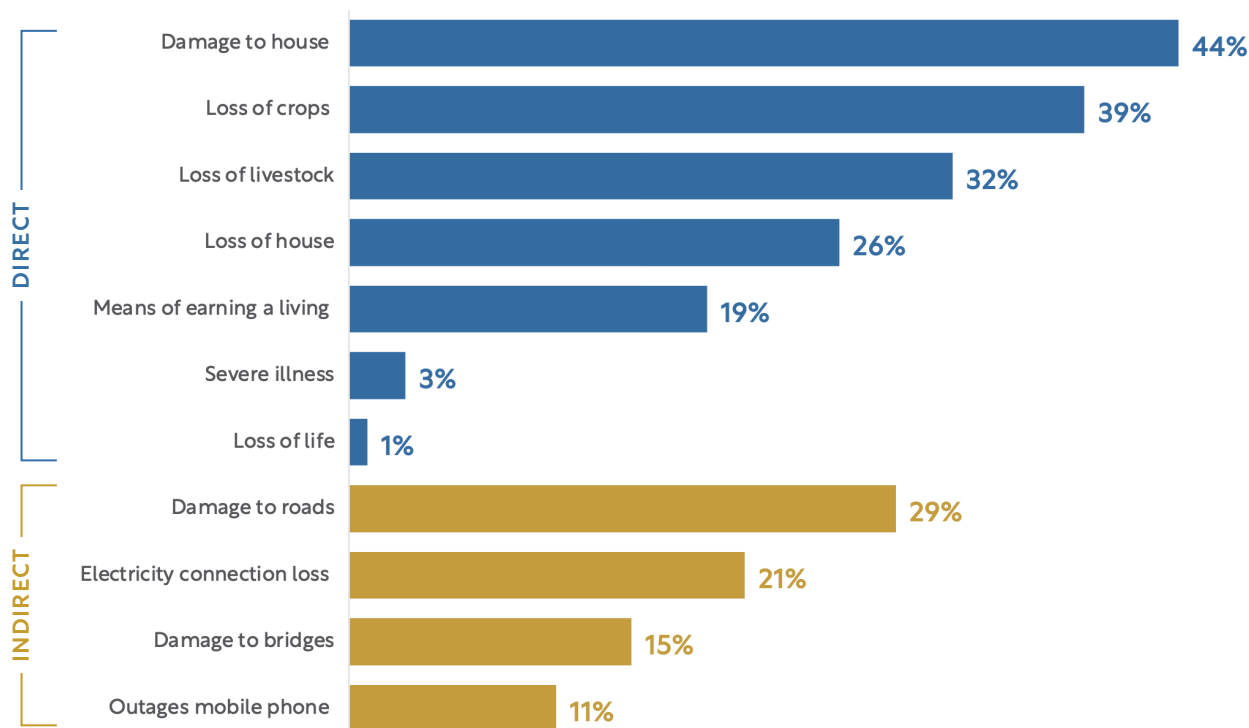


Figure 3. Families with children report direct impacts to their household and income-related activities, and indirect impacts through limited access to public goods



20%

Percent of respondents in flooded areas reported losing the means to earn a living

In flooded areas, families with children reported suffering indirect and direct losses. As shown in **figure 3**, 39 percent reported losing agricultural crops, 32 percent reported losing livestock, and 15 to 29 percent reported damage to roads, bridges, and electricity supply. There were also direct hits to households; 44 percent of families reported damage to their house and 26 percent reported losing their house. Also, 1 in 5 households reported losing the means to earn a living, casting doubt on the capacity of these families to quickly recover financially from the shock inflicted by the floods or to be able to ensure that their children will develop their cognitive, social, and behavioral skills to succeed in life.

The relief effort to reach families with children in the affected areas remains insufficient. According to the phone survey, 80 percent of respondents reported that no flood relief efforts had taken place in their area, while 45 percent of those families who lost their houses reported living in temporary shelters. Among the 20 percent who noted relief efforts, government, foundations, the army, and local initiatives were listed as the top providers of support to flood victims. These results show that there is some recognition of efforts by the authorities to support flood victims, but more relief efforts are needed.

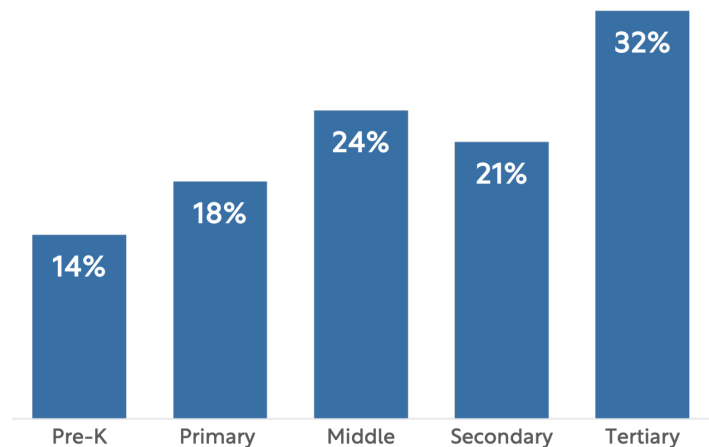
More targeted communication efforts, using multiple media to communicate in local languages, could help inform a greater number of the most vulnerable and most affected people about relief efforts.



Information about availability of relief efforts does not reach all people equally.

When asked about their knowledge of relief activities happening in the area (**figure 4**), those with a higher education level (32 percent with a university degree, 21 percent with a secondary degree) were significantly more likely to be aware of relief activities than those with only a primary school education or less (only 14 percent). The reasons for this could be many, including: (a) those with more education are more likely to be literate in different means of communication and therefore are more connected to information, or (b) relief may be more widely available in areas where more educated individuals live since those areas might be easier to access. This data, combined with the earlier observation that less educated respondents were more likely to be inundated by the floods, highlights the need for more targeted efforts to identify the most vulnerable and most affected households and to use multiple media to communicate in local languages (e.g., television, radio, visual billboards, etc.) to ensure relief efforts are reaching all affected people.

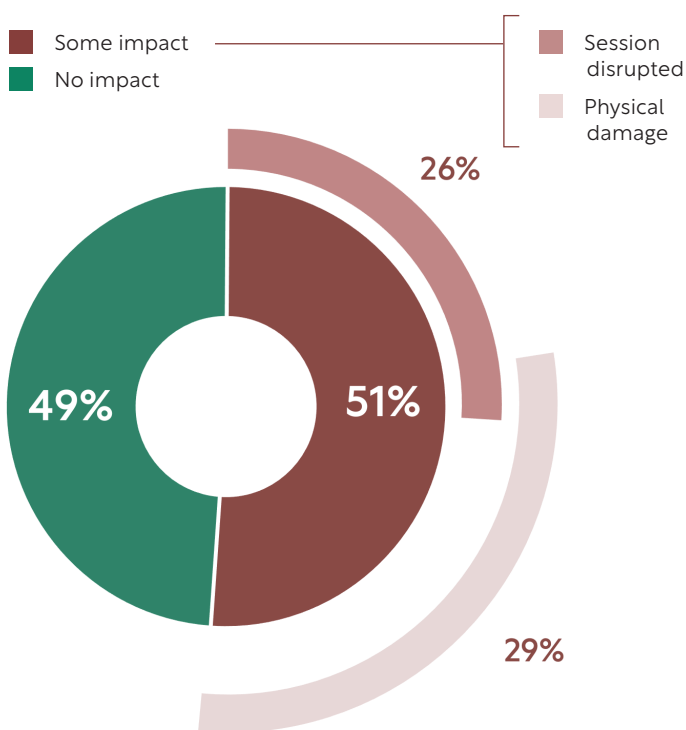
Figure 4. Educated people are more likely to be aware of relief activities to help flood victims



II. Impact of floods on children's education

There is strong global evidence that disasters negatively impact education and have potentially cumulative and long-lasting effects (Baez, de la Fuente and Santos 2010). The immediate direct effect on education can be found in the destruction of schools or reduced access to them due to the destruction of other critical infrastructure (e.g., roads, bridges, etc.). When instruction is disrupted, quality suffers and children's human capital accumulation opportunities are reduced, in both the immediate and longer term (Andrabi, Daniels and Das 2021; Husted, Opper and Park 2022).

Figure 5. More than half of those interviewed reported that the floods negatively impacted their children's education

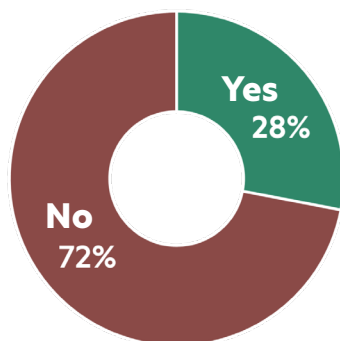


The impact of floods on education access of children has been immediate. More than half of those families with flooding in their area (51 percent) reported that the floods had negatively impacted their children's education. Nearly one-third (28 percent) of respondents reported that their children's schools were disrupted and/or damaged (**figure 5**), and almost one third (35 percent) reported that their children's school was completely damaged. School damage due to flooding most often occurred in Sindh and Balochistan. Approximately 17 percent of schools were also used as temporary shelters for displaced families, which has further depleted school infrastructure. This situation was most prevalent in Sindh.

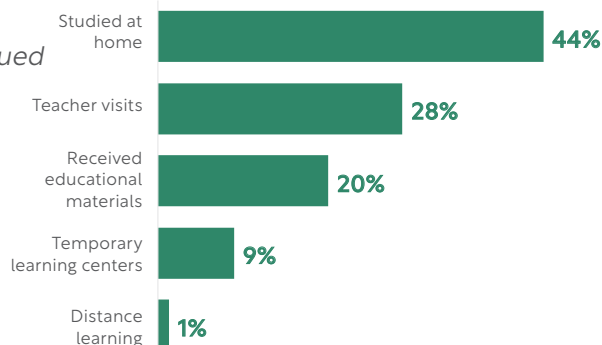
Seventy-two percent of parents reported that their children were not studying during flood-related school closures (figure 6), while 28 percent of parents said their children were continuing to learn. Among this group, 28 percent reported that teachers visited their children and 20 percent reported that their children received printed educational materials. Nine percent indicated that their children continued their studies in temporary learning centers and just 4 percent participated in distance learning.

Figure 6. Engagement of children in learning activities during school closures due to floods

Has your child continued engaging in learning activities during school closures due to floods?



How have they continued engaging?



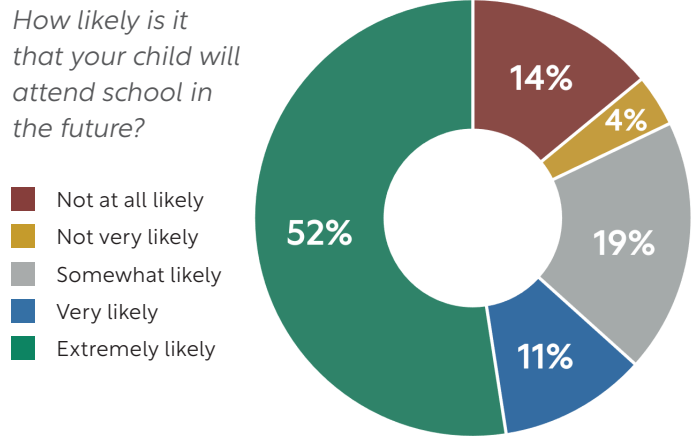
The impact of the floods could force families to reduce investments in the education of their children as families struggle with low prospects of earning a living in the short term, limited access to schools and other public services (e.g., health and transportation), and an already high cost of education. Reductions in attendance, retention, and progression have been documented after multiple disasters in other countries in South Asia (Andrabi, Daniels and Das 2021; Jacoby and Skoufias 1997), Africa (Jensen 2000), and Latin America (Ureta 2006; Santos 2007), among others. These examples demonstrate the real risk Pakistan faces in the aftermath of the floods, with 66 percent of households with children reporting income losses.

A significant number of children may not return to school in the aftermath of the floods. Over half (52 percent) of parents said their children would be extremely likely to attend school after the floods, and together with questions about whether their children were “somewhat likely” and “very likely” to attend school, the survey show that 83 percent of households were at least somewhat likely to send their children back to school (**figure 7**). When families were asked about school attendance of children if schools were to open tomorrow, a similar percentage (around 90 percent) expressed interest. These responses imply that at a minimum between 10 and 20 percent of parents are not likely to send their children back to school.

REDUCING CONSTRAINTS

To ensure parents send their children back to school **it is important to reduce the biggest constraint to education: its cost.** Floods have made education even more expensive for families.

Figure 7. Almost 20 percent of children are unlikely to attend school in the future



The impact of floods on education access cannot be underestimated. If we consider that (i) before the floods there were 15 million children in schools in the most affected provinces (Balochistan, KP, and Sindh); (ii) the floods have subsequently affected 25 percent of those in school in these areas; and (iii) 27 percent of households report that they may not send their children back to school (including half of those who report that their children are somewhat likely to return to school), it is sensible to estimate that at least 1 million children might potentially become out of school due to the floods (approximately). This number is obtained by multiplying these three figures.

Among those who said it was unlikely their children would attend school, 63 percent cited the prohibitive cost of education, both direct and indirect, as the main factor. In addition, close to 1 in 5 (19 percent) of parents said the poor quality of schools and teaching was the primary reason their child would be unlikely to attend school in the future. While rebuilding flood safe schools is a current top priority, improving the quality of the education children receive while in class is also an urgent need to convince parents to send their children back to school and to limit the lasting effects of this natural disaster.

The phone survey also explored the gender of children in returning to school by asking parents to agree or disagree with the following statement:

“Some people say that it would be difficult for female children to go back to school in their area as roads, etc. are destroyed. Even though boys may be able to go, girls would not be able to. Do you agree with this assessment?” Approximately 33 percent of parents agreed with the statement that it would be more difficult for girls than boys to go back to school in the areas where roads had been destroyed (figure 8). Parents were more concerned for girls than boys in regard to the deterioration of transport, roads, and other services. This aligns with results that point out that parents in Pakistan considered transportation services to be, even before the floods, a key determinant of school attendance for girls and young women (Barón et al. forthcoming).

Households might cope with the income shock of the floods by having their children work to help support the family. In the phone survey, 28 percent of families reported that they envisioned their child working instead of returning to school due to the economic impact of floods. This is a concern; evidence shows that children who stop attending school as a response to shocks such as natural disasters are less likely to return to school compared to other children (Beegle et al 2003; Santos 2007; Baez et al. 2007; Dong et al. 2020; De Janvry et al. 2006). Also, social norms for boys and girls play a role in whether children return to school or work during and after natural disasters (Takasaki 2017).

The education level of caregivers within families is another factor. Families in which the caregiver has tertiary education are half as likely to report that

Figure 9. Households expect their children to work due to economic difficulty following the floods

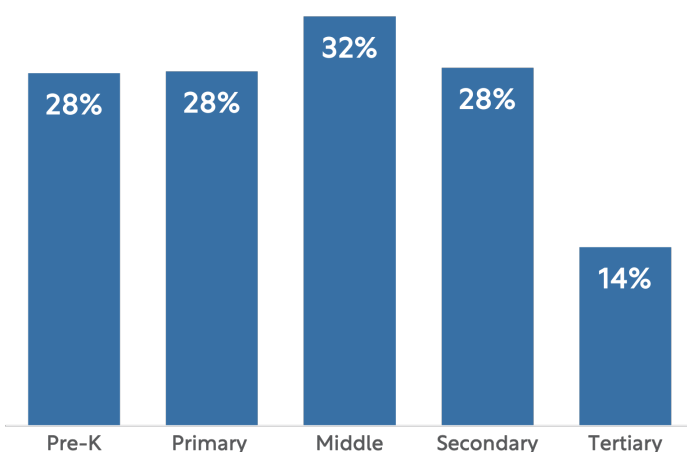
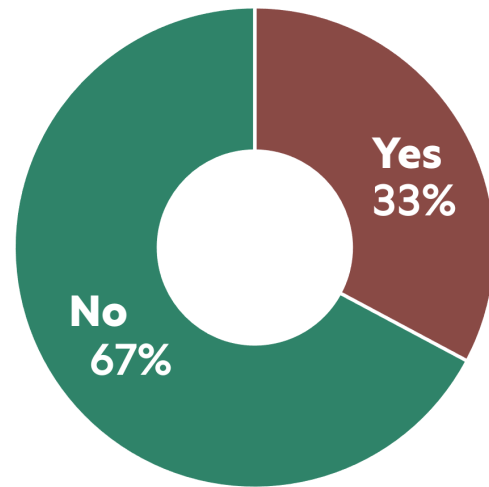


Figure 8. Some people say that it would be difficult for female children to go back to school in their area as roads, etc. are destroyed. Even though boys may be able to go, girls would not be able to. Do you agree with this assessment?



they envision their children working in the future (14 percent), while caregivers with less education are more likely to have their children work (between 28 and 32 percent, see figure 9). Geographical location also affects whether children are likely to work instead of return to school; the rate of children who are expected to work is highest in Balochistan (41 percent compared to around 27 percent in KP and Sindh). These results indicate that more could be done to encourage families to support a return to school for their children, even while schools are under reconstruction, and especially with respect to future human development.

A significant proportion of households may require their children to support the reconstruction of their home, potentially reducing children’s attendance to school. The phone survey seeks to understand whether house reconstruction is something children would be expected to help with, further preventing them from attending school. To those families who lost their home, the survey asks: “I will read out two statements regarding your child. Tell me which one you agree with: (a) Your child stays home from school to rebuild home; (b) Your child goes to school while other family/friends rebuild home.” Approximately 85 percent of flood-affected households who indicated that there had been damage to their house reported that they would keep sending their children to school while other household members rebuilt their home. However, a significant percentage of households, 15 percent, asserted that children are likely to stay at home helping with household chores and reconstruction.

III. Indirect impacts on human development

There are less direct factors that might also reduce school attendance and school quality for children. The phone survey explored three of these key indirect factors: **(a) health risks, (b) nutrition and food insecurity, and (c) transportation services.**

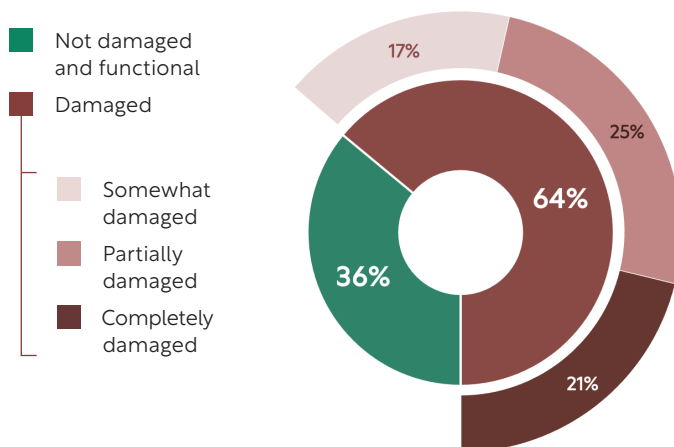
Health risks

The floods can affect human development through the destruction of health infrastructure. The importance of health infrastructure goes beyond the initial response of the emergency and extends to the recovery and support of healthy environments in situations where infection diseases and sanitation issues become more prevalent (Baez, de la Fuente and Santos 2010). Standing water caused by floods are sources for malaria and can increase the risk of gastrointestinal diseases in children, which can become life threatening if left untreated.

**Almost
1 in 3**

Households lack regular access to clean drinking water, leaving them vulnerable to disease

Figure 10. Health facilities were also damaged by floods

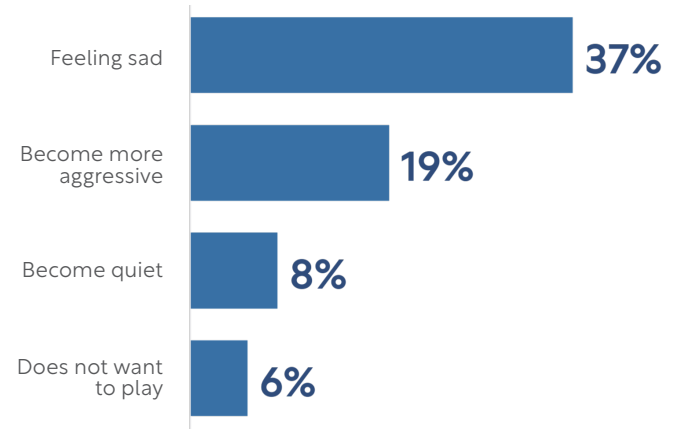


Like schools, health facilities have been damaged by the floods in Pakistan. As **figure 10** shows, respondents said health facilities were either completely damaged (21 percent) or partially damaged (25 percent) in their area; 17 percent of respondents said these facilities were “somewhat damaged.” In short, 1 in 3 health care facilities in areas covered by the phone survey seemed to have survived the floods unscathed. The lack of health facilities can impact school attendance as underwater areas generate disease, further eroding educational achievement.

Importantly, in response to the phone survey, 28 percent reported malaria and dengue outbreaks in the flooded areas. Unlike the unequal impact of the floods on different households with different educational backgrounds, flood-related diseases show no preference—all levels of educational attainment bear the burden equally. In addition, 32 percent of households reported a lack of access to drinking water on a regular basis. Lack of drinking and clean water is one of most common sources of infectious diseases.

Mental health issues are also prevalent among children who have experienced natural disasters (Lai and La Greca 2020). Children exposed to natural disasters exhibit a variety of mental health issues (Lai, Auslander, Fitzpatrick and Podkowirow 2014; Tang, Liu, Liu, Xue and Zhang 2014), including symptoms of depression (e.g., feeling sad, not wanting to play, or becoming more aggressive). As shown in **figure 11**, the phone survey shows that half of all children exhibited behavioral changes that could be attributed to the impact of natural disasters. While over one-third (37 percent) of parents noticed their children feeling sad, 19 percent said their children had become more aggressive, and 6 to 8 percent reported their children did not want to play or they became quieter than usual. Any policy response could consider complementing physical resources with socioemotional support for children who have endured the traumatic and stressful events of the floods.

Figure 11. Almost half of children exhibit changes in their behavior



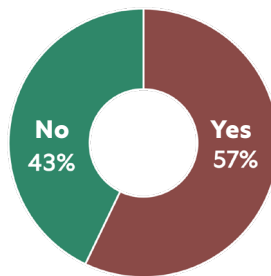
A comprehensive package of support to families

exposed to natural disasters includes socioemotional support to help children cope with trauma experienced during the floods.

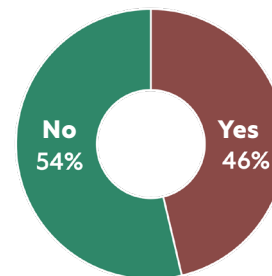


Figure 12.
Food insecurity for households with children in the past 12 months

A. Was there a time when you were worried the household would run out of food?



B. Was there a time when the household ran out of food?



Increase in food insecurity

The floods have increased food insecurity for families already impacted by inflation. The dual effects of floods on economic activity and food production have likely exacerbated food insecurity for all households, impacting the development of children. Research shows a strong negative link between natural disaster and long-lasting nutritional outcomes for children (see Baez, de la Fuente and Santos 2010).

Over half (57 percent) of families with children reported being worried that they would run out of food due to lack of money or other resources (figure 12, panel A). The phone survey shows that less educated parents were almost twice as worried about the household running out of food than the most educated parents (67 percent versus 37 percent). In fact, based on respondents to the phone survey, over one-third (46 percent) did run out of food (figure 12, panel B). Food insecurity is a real risk for the healthy development of children in flooded areas, especially for children from less-educated families.

Over the past year, households' concerns about running out of food are likely linked to increases in food prices. Approximately 67 percent of households report food prices have recently risen, with 50 percent of respondents reporting that prices increased between 10 and 50 percent over the last year. Moreover, approximately 30 percent of respondents reported having gone without food for at least a whole day due to financial insecurity. Food insecurity is worse in rural than in urban areas.

The destruction of crops by the floods has increased food insecurity in households with children. In the phone survey, 46 percent of households responded that they cultivated their own land (either for food or other products).

Approximately 75 percent of families reported damage to livestock or crops, impacting family income, children's nutrition, and the energy intake of families and their children.

The floods have likely exacerbated child malnutrition in a country where stunting and all forms of malnutrition were already high (UNICEF 2018). With inflation projected to be 23 percent for the fiscal year (World Bank 2022), the impact of floods on family incomes and the physical, socioemotional, and cognitive development of children and youth could severely erode opportunities of a generation of children in flooded areas. Targeting resources to the most affected families could mitigate the further deterioration of food security and support children's ongoing development as part of a comprehensive package of support in the flooded areas.

Disruptions to transportation

Due to the floods, transportation services have been disrupted. Floods have also constrained mobility and prevented families from traveling to regular destinations, including work and school; nearly 59 percent of families in flood-affected areas say they cannot reach those destinations. Travel has been more widely restricted due to floods in rural areas than in urban—61 percent of rural respondents reported restricted movement compared to 53 percent in urban areas. Indeed, 83 percent say flooded roads are the primary reason for their restricted movement. As floodwaters recede and after, policy makers can position transportation services to be ready when they do; 20 percent say it took more than a month for transportation services to resume in their area and 14 percent say these services were still disrupted at the time of the survey. When families cannot get to work or school, their livelihoods, food security and overall human development are at risk.

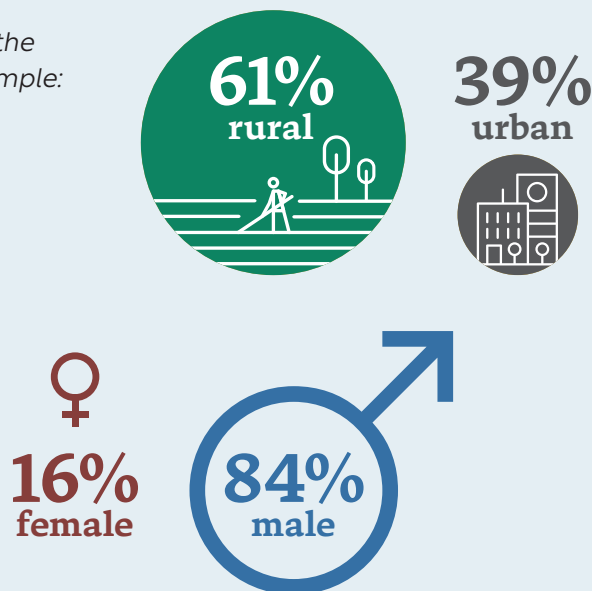
IV. Methodology and survey design

The data used in this note come from a nationally representative phone survey carried out by Gallup Pakistan. Data collection was carried out from September 29 to October 28, 2022.

The survey was carried out using random digit dialing (RDD) of mobile phones using all four telecom providers with active numbers across Pakistan. Approximately 93 percent of households have access to a mobile phone (Government of Pakistan 2021). Despite the high-penetration rate of mobile phones, lower-income households are overrepresented in the remaining 7 percent of those who do not have access to mobile technology. This most likely means that in many cases the results presented show an underestimation of the true impacts of the floods on families and their children in Pakistan.

To survey households, each random number was called until a call was answered (with a maximum of three attempts). To maximize the response rate, calls were placed at different times on different days of a week. Once an individual was contacted on his or her mobile phone, consent was obtained, a screening questionnaire was administered, and a unique study identification number was generated for the respondent. Interviewers entered data into a tablet with Survey CTO software that had the preloaded questionnaire with automatic skipping patterns (Computer Assisted Telephone Interviewing, CATI).

In the sample:



4,044

Completed surveys in the study

The target population of the survey were parents or caregivers of children ages 3 to 17. If more than one child lived in the household, one child was randomly selected as the subject of inquiry. The sample was stratified by gender of the child. The survey also oversampled households that reported any impact of floods, aiming for a sample of at least 1,000 households that suffered effects of floods in their area. The survey collected information on the education status of children, food security, child work, health, environment, and household composition. A limited set of sociodemographic characteristics was also collected, including education of parents, assets, gender, family composition, rural, urban, district, and province.

The survey randomly called 40,800 numbers, reaching 15,750 individuals who answered the phone, of which 5,420 agreed to the interview, 1,346 with incomplete surveys, and 4,044 with complete surveys. At the beginning of the survey, enumerators offered a PKR 200 phone credit for completing the survey to 75 percent of those who answered the phone (selected randomly). To be able to better capture the aggregate impact, weights were created for the selection of province, rural/urban, sex, and education of household head.

CAVEAT ON INTERPRETATION OF RESULTS | Phone surveys are known to miss families at the bottom of the income distribution who usually do not have mobile phones or live in hard-to-reach areas (where cellphone coverage is limited). In the current context, the damaged caused by floods may have exacerbated those issues as the floods could have increased the difficulty to reach poorer households or those that lost everything. Thus, the results and interpretations in this note should be taken with those factors in mind. In most instances, the results presented in this note are likely to underestimate the magnitude of the impact given the characteristics of those who might not be reachable via phone calls.

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