# High returns, low adoption: Air purifiers in Bangladeshi firms

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- Air purifiers deliver 10% productivity gains and 18% profit increases in Bangladesh's garment factories—with payback in under three months during peak season—yet fewer than 1% of firms have adopted this technology.
- Traditional interventions (information, credit, warranties) failed, but low-risk purchase contracts enabling personalised learning increased willingness-to-pay by 20-30%, suggesting that firms need to experience returns firsthand to resolve uncertainty about the purifier's return on investment.
- With developing countries facing decades of hazardous air pollution, workplace air purifiers offer a pragmatic, market-based approach to sustaining economic growth—protecting worker productivity and firm profitability while regulatory solutions remain distant.

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## High returns

A year-long randomised field experiment in Dhaka's ready-made garment (RMG) manufacturing sector provides the first causal evidence of air purifiers' impact on labour productivity and firm profit. Researchers installed air purifiers at no cost in randomly selected firms, finding severe indoor PM2.5 pollution levels averaging 75 µg/m3, 15 times the World Health Organization's annual guidelines. Firms used purifiers for 4-6 hours daily, increasing usage during pollution peaks. This proactive use resulted in a 15% decrease in PM2.5 levels, a 10% increase in daily labour productivity, and an 18% increase in monthly profits compared to control firms. During peak production months, productivity increased by 23% and profits increased by 39%, suggesting that returns on air purifier investment are highest when firms have little production slack. Overall, results suggest that the average owner would recover purifier costs in less than three months of high production.

### Low adoption

Despite this, fewer than 1% of firms own an air purifier. Why?

- **Uncertainty**: Our survey of owners' beliefs about purifier profitability revealed uncertainty and heterogeneity in expected returns: 20% were uncertain about returns, another 20% expected no profit gains, and 5% anticipated gains but couldn't quantify them. Among the 55% who expected specific increases, most predicted only 5-10% gains—far below our experimental estimate of 18%.
- **Production slack**: Firm owners who expected no profit gains cited two primary reasons: profits depend on orders, making purifiers irrelevant during slack periods; and purifiers seem unnecessary for productivity. Owners recognise that purifier returns depend critically on capacity utilisation, precisely what our first experiment demonstrated, yet they are uncertain about or underestimate the peak-period benefits.

### Why we need to act now

Air pollution already drains 4% of Bangladesh's GDP annually, and even optimistic regulatory scenarios project decades of hazardous air—making workplace air purifiers a critical bridge technology that delivers 10% productivity gains and 18% profit increases with fast payback.

## Possible way forward

Our findings suggest that conventional approaches to technology adoption may be less effective than assumed. Standard interventions—information provision, credit access, and product warranties—did not impact air purifier adoption. However, purchase contracts enabling low-risk experiential learning showed promise: money-back guarantees and free trials increased willingness-to-pay by 20-30%, indicating that firms' main barrier isn't lack of information, financing, or product concerns, but rather uncertainty about firm-specific returns that personal experience can address. The 81% higher willingness-to-pay among firms with prior experience supports this learning-by-using mechanism. For policymakers and development organisations, these results suggest considering alternatives to traditional information and credit programs. Instead, temporary subsidy schemes allowing firms to test defensive technologies risk-free during peak production periods—when returns are most apparent—may be more effective. Such "try-before-you-buy" approaches could help scale adoption of defensive technologies needed to maintain productivity amid ongoing environmental challenges.

## References

Garg, T., Jagnani, M., & Lozano-Gracia, A. (2025). High Returns, Low Adoption: Air Purifiers in Bangladeshi Firms. Mimeo.